



Tech Tonics

TIMSCDR Research Journal

Volume 5 2016-2017



EDITORIAL BOARD

Editor-in-Chief

Dr. Vinita Gaikwad

Editorial Board Members

Ms. Rupali Jadhav

Ms. Puja Agarwal

Student Members

Ms. Anagha Patwardhan

Ms. Apurva Khedkar

Mr. Matsyendra Mishra

Mr. Rohit Maurya

Ms. Gauri Naik

Ms. Trisha Yadav

Mr. Gaurav Pandey

Ms. Mansi Desai

PUBLISHER

Thakur Institute of Management Studies, Career Development & Research

Thakur Educational Campus,

Shyamnarayan Thakur Marg,

Thakur Village, Kandivali (E), Mumbai – 400 101

Telephone: 022 - 2884 0484/91, 022 - 67308301/02

Fax: 022 – 28852527

Email: timsedr@thakureducation.org, vinita.gaikwad@thakureducation.org

Website: www.timsedrmbai.in

AIM

The research and development is transforming the computing paradigms and technology in multidimensional directions. Tech Tonic aims to inculcate research culture among post graduate students and make them aware of new innovations happenings in the field of information technology.

TECH TONICS

TIMSCDR Research Journal

Volume 5
Academic Year: 2016-2017

Published By

Thakur Institute of Management Studies, Career Development & Research
Thakur Educational Campus, Shyamnarayan Thakur Marg,
Thakur Village, Kandivali (E), Mumbai – 400 101

Vision

Thakur Institute of Management Studies, Career Development and Research will become a premier Institute renowned internationally for providing education in Software Application to graduates from various disciplines.

Mission

To achieve excellence in providing software education so that students can grasp existing as well as emerging technologies and to inculcate leadership and managerial qualities in them so that they can deliver results in the organization they join.

Quality Policy

We, the staff, faculty and the management of Thakur Institute of Management Studies, Career Development and Research are committed to offer excellence in software education, conducive academic environment and state of-the-art infrastructure to our students

We will work as a team and interact with students in pro-active manner to achieve our Quality Objectives and fulfill all academic, statutory and regulatory requirements to entire satisfaction of our students as well as for continual improvement of QMS.

Program Educational Objectives(PEOs)

1. To develop technical, professional and analytical knowledge and skills of the students in computer applications to make them competent to develop and implement computer applications to meet the demands of IT in all domains at National and International levels.
2. To plan, analyze, design, code, test & implement application software & real time software using emerging technologies with financial perspectives.
3. To enhance the career prospects of graduates in the field of software development, networking, web & mobile applications, database management, academics and to promote the use of open source technology for Research & Development and Entrepreneurship.
4. To develop critical thinking, communication, teamwork, and leadership skills necessary to function productively and professionally
5. To prepare broadly educated, expressive, and ethical graduates with proven expertise to pursue life-long learning to serve the society as responsible citizens.

Program Outcomes: (POs)

Knowledge Development/Academic aptitude:

1. Ability to apply knowledge of Information Technology, Mathematics, Management and Financial Accounting to the fields of computer applications.
2. Ability to utilize the acquired skills for using modern techniques and computing tools for analysis design and implementation of computing systems related to real life problems.
3. Ability to effectively formulate, analyze, interpret, innovate and evaluate research designs, methods, and draw conclusions. Ability to understand the impact of computer software development from economic, environmental & social context.

Social and Communication Skill Development/Building:

1. Ability to effectively communicate technical information in speech presentation & in writing. Recognition of the need to engage in lifelong learning and pursue professional development.
2. Create & develop innovative computing solutions using scientific approaches, best practices & standards in meeting user needs and to excel as an entrepreneur.

Attitude Development/Building

1. An understanding of professional, legal & ethical issues & responsibilities pertaining to the field of software development.
2. Work & function effectively in multi-disciplinary teams to accomplish a common goal.

Tech Tonics: TIMSCDR Research Journal, Volume 5, 2016-2017

RESEARCH PAPERS		
1	A Comparative Study between Augmented Reality and Virtual Reality <i>Akshay Mehta , Matsyendra Mishra, Kunal Mistry guided by Ms. Puja Agarwal</i>	01
2	Importance of DBMS in MCA: Analyzing Student Preferences <i>Chandra Bhushan Singh , Aman Kumar ,Bablu Yadav guided by Ms. Aprajita Singh</i>	06
3	Comparative Study of Management and Technology <i>Manisha Yadav, Meera Yadav,Pooja Yadav guided by Ms. Rydhima Chopra</i>	08
4	Cyber Security: Through IoT (Internet of Things) <i>Urvi Asolkar, Poonam Bhagat,Shashank Bharwad guided by Ms. Megha Mudholkar</i>	11
5	Biometrics Security System <i>Tanushree Kumar, Krishnakant Maurya, Mohanish Masdekar guided by Ms.Sonam Pareek</i>	14
6	Success Rate Of Software Projects: A Comparative Study <i>Anagha Patwardhan , Radhika Kapre , Shraddha Mhatre, Aishwarya Mungekar guided by Ms. Jayashree Jain</i>	17
7	Network Security with Cryptography <i>Kajal Chodhary,Virendra Choudhary, Hitesh Daiya guided by Ms. Megha Mudholkar</i>	20
8	Biometrics: The Future of Mobile Phones <i>Yasmeen Shaikh, Saddam Shaikh, Ashu Singh guided by Ms.Sonam Pareek.</i>	25
9	Character Animation from 2D Pictures and 3D Motion Data <i>Seema Choudhary,Chinmay Chavan , Chnadrabhushan Dubey guided by Ms. Sudeshna Sen</i>	29
10	Evolution of Cyber Crimes <i>Namrata Khorjuwekar, Deepesh Lad, Amit Kushwaha guided by Ms. Reshmy Rakesh</i>	35
11	Buffer Management In Distributed Database Systems: A Data Mining-Based Approach <i>Abhishek Singh , Anurag Singh, Karan Singh guided by Ms. Sonu Gupta</i>	38
ARTICLES		
1	Car Parking finder <i>Rahul singh , Rohit singh,Suraj bhushan Singh guided by Mr. Vinay Sahu</i>	40
2	ATM with Finger-Print Biometric Technology <i>Ajith Krishnan ,Akshay Mistry , Anuj More guided by Ms. Reshmy Rakesh</i>	42
3	Bringing Real-life Practice in Software Project Management Training Through a Simulation-based Serious Game <i>Snehalkumar B. Parmar , Darshan Pawale,Ashish Tripathi , Pooja Tiwari guided by Ms.Jayashree Jain</i>	43
4	Recruitment In IT Sector <i>Pandey Khushbu , Pandey Saurabh, Pandey Sudanshu guided by Ms. Rydhima Chopra</i>	49

Editorial

It gives us colossal pleasure to release the fifth volume of our Research Journal, Tech Tonics – TIMSCDR Research Journal. It is a collection of scholarly research papers and articles written by students of MCA (Masters in Computer Applications) course, comprising of research work in the domains of Computer Science, Information Technology and Applications.

The Journal showcases the research endeavors of Post Graduate level students. This helps them to understand IT industry problems either analytically or practically. These efforts will inculcate ability to think and elaborate new ideas amongst the students in the dynamic field of Information Technology.

The Journal represents research work in various specializations in Information Technology like application of Mobile Technology, Biometrics, Network Security, Cyber Crime, Database Management System, Simulation, Virtual Reality, Augmented Reality, Software Project Management, Computer Graphics, Internet of Things (IoT).

To ensure the originality of research work, the research papers are thoroughly checked for plagiarism and selected for publication. Students of TIMSCDR get opportunity of sound exposure to the field and relevance of standard research work through this academic exercise of performing research and presenting the same through research papers.

Finally, this Research Journal is a modest effort to encourage the young, enthusiastic and resourceful minds of the students to do research using latest techniques, and innovate and pen down emerging ideas in the field of Information Technology and Applications.

Editor
Dr. Vinita Gaikwad
Director, TIMSCDR

RESEARCH PAPERS

A Comparative Study between Augmented Reality and Virtual Reality

Guided by: Ms. Puja Agarwal

Akshay Mehta
TIMSCDR.

Matsyendra Mishra
TIMSCDR.

Krunal Mistry
TIMSCDR.

Abstract: In this paper we survey the fields of virtual reality (VR) and augmented reality (AR), in which user is immersed into a virtual reality and where 3-D virtual objects are integrated into a 3-D real environment, in real time respectively. It describes the medical, military, entertainment and other applications that have been explored. This paper describes the characteristics of augmented and virtual reality systems, including a detailed discussion on the working of VR and AR.

So this paper summarizes a comparison between VR and AR, their current applications and future direction requiring further research. This survey provides a starting point for anyone interested in understanding or researching Virtual and Augmented reality.

Keywords: *Virtual Reality, Augmented Reality.*

I. INTRODUCTION TO VIRTUAL REALITY

Virtual Reality is the word can be simply defined as world created and developed by human experienced as real. It makes a general computer user to enter in the world of graphics which allows human to view surrounding world and the things which are real or not even yet created by simulating use senses .You'll probably never go to Mars, swim with dolphins, or fight with criminals of Gotham. But this technology could make it possible to do all these things and many more, without even leaving your home. Unlike the reality (the actual world in which we are in), virtual reality means simulating our world (or completely imaginary worlds) using high-performance computers and sensory equipment, like headsets and gloves. Apart from games and entertainment, it could be used for training airline pilots and surgeons and for military purposes wherein a soldier can carry out mock drills in that world. [1]

A. WORKING

The equipment required for this technology is being used by Oculus, Sony, HTC, Samsung and Google and usually requires three things. A PC, console or smart phone to run the app or game, a headset which secures a display in front of your eyes and some kind of input - head tracking, controllers, hand tracking, voice or track pads.

These glasses behave in a similar way to a pair of 3D goggles wherein they display two images. Ordinary glasses show a single 3D image and virtual reality glasses which contains polarized lenses that shows two

images, one per each eye. These images appear to give an illusion of depth which is a particular feature of CAVE environments. The technical name for this is stereoscopy.

More advanced versions of these glasses contain head tracking systems. Computer is connected to this system which sends signals to adjust the images seen by the wearer or user as they move around their area. Once again, this is a particular aspect of CAVE fully immersive virtual reality.

These glasses enable the wearer to see three dimensional images which give an illusion of depth of perception. For example, if the wearer is using this technology for architectural purposes then they will be able to view a building at different angles, and even walk through or around it.

Many types of glasses contain a tracking system which maps the wearer's movements and adjusts the images accordingly. Each time the wearer moves his head, walks in a particular direction or takes some other form of action, the scene in front of him changes as he does so.

Computer is connected to the tracking system which adjusts these images so that the wearer or user is shown a realistic place with a realistic depth of perception. The tracking needs to be as accurate as it can be or else the illusion will fail.

The glasses enable the wearer to see two separate images which the brain combines into one. This is what gives the illusion of 3D depth. This is often accompanied by video and/or sound which add to the experience.[1]



B. APPLICATION

- **Military with virtual reality:**
The technology has been adopted by the military which includes all three services that is army, navy and air force where it is used for training purposes. This is specifically useful for training militants for combat situations or other dreadful settings where they could learn how to react in an appropriate manner.
Such simulation enables them to do so but without the risk of death or a fatal injury. They can re-enact a particular scenario, for example engagement with an enemy in an environment in which they experience this but without the real world risks. This has proven to be safer and less costly than traditional training methods.
- **Medical with virtual reality:**
Healthcare is an area where this technology could be very useful which encompasses surgery simulation, treatment of various phobias and also for rehabilitating of patients suffering from stroke. One of the advantages of this technology is that it allows medical personnel's to learn new skills as well as refreshing existing ones in a safe environment. This could be applied with zero negative effect over the patients.[7]



- **Entertainment with virtual reality:**
Entertainment is the area where this technology fits perfectly, mostly in games and virtual worlds. But other equally popular areas include virtual museums, interactive exhibitions, galleries, theatre, and virtual theme parks. These areas can be classified as 'edutainment' in which the aim is to educate as well as entertain. Moreover virtual reality can also applied with Education with virtual reality, telecommunication with virtual reality, Sports with virtual reality, media and films with virtual reality.

C. PRODUCTS

- i. **HTC VIVE:** The HTC Vive, is the Steam VR headset made in collaboration with Valve, the

makers of legendary gaming series Half Life
Approximate cost \$799

- ii. **Oculus Rift:** Oculus Rift is the headset that started the current hysteria. Developed by Palmer Luckey, funded via Kickstarter and snapped up by Facebook for a cool \$2 billion, the Rift plugs into your computer's DVI and USB ports and tracks your head movements to provide 3D imagery on its stereo screens. Approximate cost \$599
- iii. **Sony Play station VR:** Developed by SONY a gaming VR for play station grammar, the 5-inch LCD display of the original prototype; in its place a 5.7-inch OLED one which enables low persistence, which should mean less motion blur. Approximate cost \$399
- iv. **Samsung gear VR:** The Samsung Gear VR is actually Oculus Rift lite, given that the two companies collaborated for the technology. Approximate cost \$99
- v. **Google Cardboard:** Google announced its Cardboard virtual reality headset at I/O 2014 and unveiled version 2 at the 2015 conference. Popping a smart phone into a cardboard container and then strapping it to your head may sound like a joke, but it actually works and it could become a low-cost way to experience virtual reality. Approximate cost \$16.99

II. INTRODUCTION TO AUGMENTED REALITY (AR)

Whereas virtual reality captivates your senses perfectly in a world that only occurs in the digital realm, augmented reality takes the real world of the present and imposes digital imagery and sound into it. Augmented and Virtual Reality both fall on the perpetuity of mediated reality, which is where a computer system alters our understanding of reality versus the "actual" world.

As you can presumably infer this means many things qualify as augmented reality. You may speculate that things like "distance from current position to a target", aka GPS or your current speed are examples of augmented reality. However, when we think about augmented reality it normally refers to a much more sophisticated, interactive and spatially aware application of the concept, where digital objects such as 3D models or videos are presented onto our view of reality as if they were actually there.

To prevent limiting AR to specific mechanisms, we select that definition that defines AR as any system that has the following three characteristics:

1. combines real and virtual
2. Is interactive in real time
3. Is registered in three dimensions

This definition allows inclusion of other technologies besides Head Mounted Displays while retaining the essential components of AR.[2]

A. WORKING

The type of augmented reality you are most likely to encounter usually employs a range of sensors (including a camera), computer components and a display device to construct the illusion of virtual objects in the actual world.

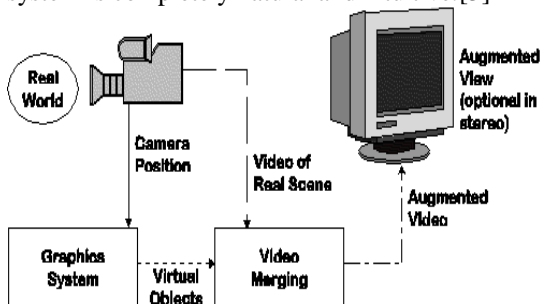
Owing to the popularity of smart phones, which nowadays include all the necessary components, they have been the target for most commercial augmented reality applications that have been released.

Generally the device looks for a specific target. It can be anything, but normally it's a 2D image printed on something like a film poster. Once the AR app recognizes the target via the camera, it analyses the image and augments it in a certain way with pictures and sound. For instance, you may see the film-poster spring to life and display a trailer for the movie. As long as you look at the poster through the "window" of the display you can view augmented reality instead of same old vanilla reality.

By using smart-algorithm capable processors and other sensors such as accelerometers and gyroscopes the device can maintain the augmented elements' alignment with the image of the real world.

Using a smart phone or tablet computer as a "magic window" into the augmented world is one of the ways we can relay digital info to our eyes, but there are various other ways to achieve this.

Digital imagery can be presented directly onto physical objects. This is identified as projection mapping and can be used to impose 'quite the striking effect'. For example, the Dyadic Mano-a-Mano utilizes projectors and Microsoft Kinect sensors to impart the user with 3D digital imagery projected directly onto the environment. The user does not require wearing equipment or using any devices. Interaction with this system is completely natural and intuitive.[3]



B. APPLICATION

- **Military with augmented reality:**

Augmented reality has been adopted by the military – this includes all three services (army, navy and air force) – where it is used for training purposes. This is particularly useful for providing additional informational assistance to soldiers for combat situations or other dangerous settings

where they have to learn how to react in an appropriate manner.

Military use cases are also quite clear, since soldiers wearing heads up displays (HUDs) can see information tagged onto objects in the real world. Radar information, orders or any other relevant sensor data or information from devices on the network can be provided using it. Enemy and friendly positions are of course also useful to know. Augmented reality clearly has a bright future in military applications.

- **Medical with augmented reality:**

In medical practice augmented reality can project information directly onto the body of a patient. For example, the Vein-viewer system projects a real-time image of infrared vein scans directly onto the patient's skin, creating the impression that the skin is transparent. This allows the doctor to "see" the veins directly.[6]

- **Entertainment with augmented reality:**

The two areas where we have seen a lot of commercial application in augmented reality are education and gaming sectors. The two biggest mainstream video game consoles, the Xbox and PlayStation, have included augmented capabilities for the last two console generations in the form of the Kinect (for the Xbox) and PlayStation Eye or Camera (for the PlayStation 3 and 4 respectively). Since we are facing both the camera and the screen, these implementations are more like augmented reality mirrors, where you see your self-representation "in" the game and can interact with game characters that look to be in the same room as you. Mobile augmented reality games are also not rare, and can be found on smart phones, tablets and handheld consoles such as the Nintendo 3DS and PlayStation Vita.

C. PRODUCTS

Pokémon Go integrates the use of AR technology with the Global Positioning System and camera functions of various smart devices equipped with Android 4.4+ / iOS8+, strong internet connection and GPS & location services. Developed by Niantic, a company specializing in augmented reality games, Pokémon Go encourages players to explore the real world looking for characters from the Pokémon franchise. Beginning with the creating and designing an avatar, players next view a main map which overlays real-world geographic details such as streets with in-game items and destinations, named as Poké-Stops and Pokémon gyms. As the player moves in reality, the avatar moves on the AR map.

When a player encounters a Pokémon, he/she has the option of capturing it in front of a digital background or superimposed over a real-world image in AR mode. In the latter case, the game uses the device's camera causing it to appear as if the virtual character actually

exists in the natural world, giving the player's attempts at capturing the Pokémon all the more a realistic experience.



III. VR VERSUS AR

With VR, the user is detached from the real world while captivated in a world that is completely fabricated. With AR, users continue to remain in touch with the actual world while interacting with virtual objects around them.

Virtual reality is able to transpose the user, which is bringing the user someplace else. Augmented reality however, does not move the user elsewhere. It simply "augments" our current state of perception.

What is the base difference? Think scuba diving vs. going to the aquarium. With VR, you can actually experience swimming with sharks. While with augmented reality, you can watch a shark come to life right out of your business card.

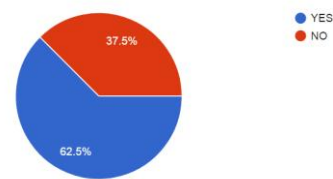
While VR is more immersive, AR provides more freedom to the user and more possibilities for marketers because it not dependent on a head-mounted display.

While both AR and VR are gaining speed, AR has the acceptance edge as it is less hindered by our ability to render 3D environments in real-time.

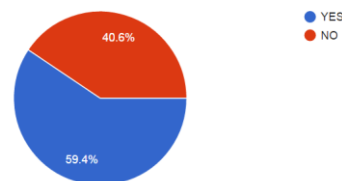
As it stands, AR is ahead of VR, as there are several products already on the market. We are witnessing the rise of AR hardware devices from Google in the form of Glass and another major product from Microsoft on the way. On the other hand in VR, the technology is just stepping up to the plate. It's still far away from being this great thing for social encounters in a virtual world, but with the rise of the Oculus Rift, it is getting there.[3]

IV. SURVEY on VR Vs AR

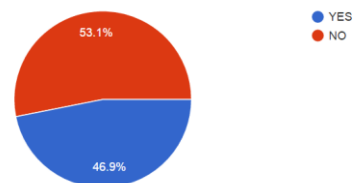
Have you heard of Augmented Reality? (32 responses)



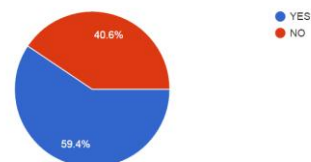
Have you heard of Virtual Reality? (32 responses)



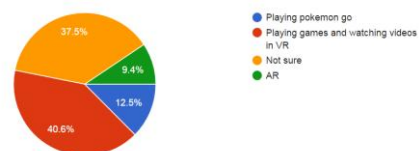
Do you play Pokemon Go? (32 responses)



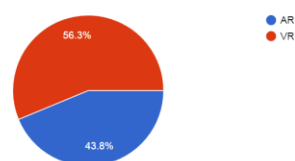
Have you ever used Google cardboard , VR box, Gear etc ? (32 responses)



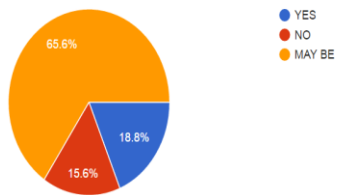
What do you like more? (32 responses)



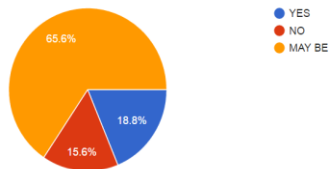
On which technology would you like more products to be build? (32 responses)



Do you think AR can be helpful in our day to day work? (32 responses)



Do you think VR can be helpful in our day to day work? (32 responses)



V. CONCLUSION

After researching on these two technologies it is very much clear that both will hugely affect our world in an optimistic manner. Education, health, engineering and many more fields will make use of this technology to get benefited. According to the survey virtual reality is more beneficially than argument reality in our day to day work to do things easily.

REFERENCES

- [1] www.vrs.org.uk/virtual-reality
- [2] www.vrs.org.uk/augmented-reality
- [3] "A Survey of Augmented Reality", Ronald T. Azuma
- [4] "Virtual Reality-Past, Present and Future", Enrico Gobetti and Riccardo Scateni
- [5] "Educational Uses of Virtual Reality Technology", Christine Youngblut
- [6] Azuma, Ronald. Tracking Requirements for Augmented Reality.
- [7] Communications of the ACM 36 , 7 (July 1993), 50-51.
- [8] "Recent Advances in Augmented Reality"
- [9] "Virtual Reality in Stroke Rehabilitation"
- [10] Azuma, Ronald T. Predictive Tracking for Augmented Reality.Ph.D. dissertation. UNC Chapel Hill Department of ComputerScience technical report TR95-007 (February 1995)
- [11] Feiner, Steven. Augmented Reality. Course Notes, 2: ACM SIGGRAPH 1994, 7:1-7:11.
- [12] H. Tamura. Steady steps and giant leap toward practical mixed reality systems and applications. In VAR'02: Proc. Int'l Status Conf. on Virtual and Augmented Reality , Leipzig, Germany, Nov. 2002.

Importance of DBMS in MCA: Analyzing Student Preferences

Guided by: Ms. Aprajita Singh

Chandra Bhushan Singh
TIMSCDR.

Aman Kumar
TIMSCDR.

Bablu Yadav
TIMSCDR.

Abstract: Database Management System or DBMS in short refers to the technology of storing and retrieving users' data with utmost efficiency along with appropriate security measures. This tutorial explains the basics of DBMS such as its architecture, data models, data schemas, data independence, E-R model, relation model, relational database design, and storage and file structure and much more .

Keywords: Database, dbms Studying.

I. INTRODUCTION

A Database Management System (DBMS) is a set of programs that manages any number of databases. A DBMS is responsible for: accessing data inserting, updating, and deleting data .security integrity, facilitated by locking, logging application-defined rules, including triggers supporting batch and on-line programs facilitating backups and recoveries optimizing performance maximizing availability maintaining the catalog and directory of database objects managing the buffer pools acting as an interface to other systems programs supporting user interface packages, such as the popular SQL interface for relational database systems. There are 3 traditional types of database management systems: hierarchical, relational, and network. Current popular database systems include Oracle; Sybase (same as Microsoft's SQL Server but on a different platform); IBM's DB2, IMS, and SQL/DS; Ingres; Informix; and smaller, but reasonably powerful off-the-shelf products such as dBase, Access, Foxpro, Paradox, and dozens of others. The choice of a database product is often influenced by factors such as , the computing platform (i.e., hardware, operating system) the volume of data to be managed the number of transactions required per second existing applications or interfaces that an organization may have support for heterogeneous and/or distributed computing cost vendor support. Object-oriented database systems are currently in development. They allow us to model and manipulate complex data structures and objects, and hence support many new applications, including CAD/CAM. As of 1996, object-oriented databases represent a very small segment of the commercial market (perhaps 1%). It is interesting to note that some major DBMS vendors are starting to support complex objects (such as images) in their relational products. This paper makes an attempt to find the students thought on studying DBMS

programming language and how important do they think it is to learn DBMS at the Master in computer application course. This paper also investigates what type of database technologies they used previously. There are various sources on web to study DBMS online like YouTube, E-Books and websites namely www.tutorialpoint.com. Students watch videos and online tutorials where different concepts are explained and elaborated with the help of good examples.

II. RESEARCH STUDY

The research study includes an online survey carried out for all students studying DBMS at the MCA level in Mumbai. Around 8 questions on similar line were asked. Respondents were mostly from Mumbai area. Online survey was conducted so that respondents can give their view easily. They provided respective email id, which is very important for the study to be authentic.

A. Objectives

The primary research was carried out with following objectives:

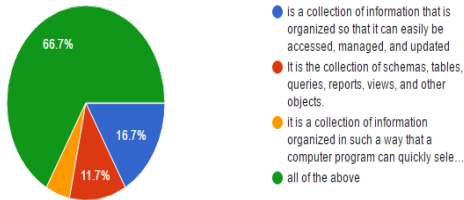
- To identify which type of database technologies student prefer.
- How important they think dbms is in MCA curriculum.
- Methodology

Primary data was collected by the survey responses. Secondary data was collected from the internet. Various research papers on the same lines were also consulted. Findings from them have been listed in the following paragraph

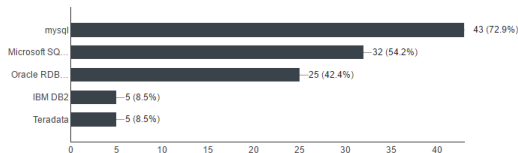
B. Analysis and Discussion

Survey questions filled by the respondents are discussed below. Graphical representation of results are put in a where ever necessary. Responses from 100 respondents were collected and analyzed.

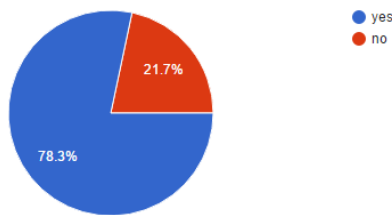
Question 1: what is database according to you?(100 responses)



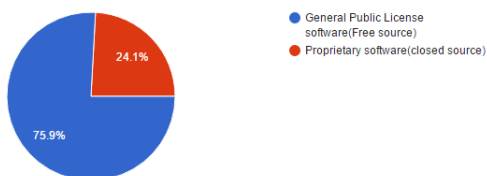
Question 2: what database technologies do you know?



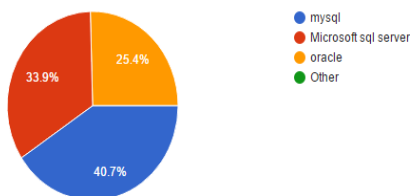
Question 3: Do you have practical experience of working with databases?



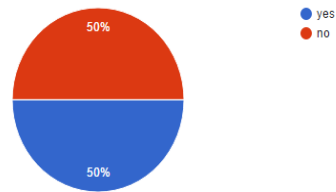
Question 4: Which type of database technology you prefer?



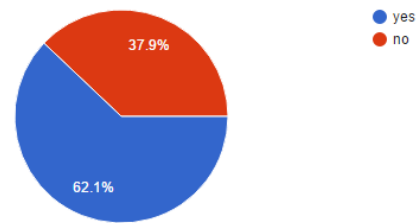
Question 5: which DBMS technology you used previously with your project?



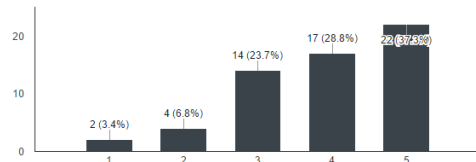
Question 6: Do you feel lack of database knowledge in mca ?



Question 7: Are you interested in DBMS certification?



Rate importance of DBMS in MCA curriculum.



III. CONCLUSION

A Database Management System (DBMS) is a set of programs that manages any number of databases.

There are mainly two types of database Free source and close source from above survey it is clear that 74.9% of student prefer free source.

MySQL is most commonly used dbms technology. 50% student feel there is a lack of database knowledge In mca. 37.99% voted Dbms as important subject in mca.

62.1% students are interested in MCA certifications.

REFERENCES

- [1] Oracle8 Server Distributed Database Systems, Oracle, 3-1 – 3-35.
- [2] http://www.tutorialspoint.com/dbms/dbms_overview.htm
- [3] <http://www.w3schools.in/dbms/database/>
- [4] M, Valdúriez P, 1991, Principles of Distributed Database Systems, Prentice-Hall. P. Bernstein, V. Hadzilacos and N. Goodman,

Comparative study of Management and Technology

Guided by: Ms. Rydhima Chopra

Manisha Yadav

TIMSCDR

Meera Yadav

TIMSCDR

Pooja Yadav

TIMSCDR

Abstract- Examines the increasing confusion among the students who wants to pursue a post-graduate degree related to business or Information Technology (IT) disciplines. Business and the disciplines of IT are becoming more and more intertwined day by day. The students are in great confusion whether to go with business or with the IT industry. On top of it, our education system offers various courses related to business and IT or business in IT which leads to more confusing environment among students. This context proposes that our education institutes need to find some solution to clear the doubt of students according to their ability and interest.

Keywords –Master in Computer Application (MCA) And Master in Business Administration (MBA)

I. INTRODUCTION

Most of the B.Com, BCA and B.Sc (Commerce, Science, IT) Students appearing their graduation are always confused for their higher-level degree. There are many PG degrees available with respect to many different fields, but the degree which attracts most of the student is either MCA or MBA.

MBA and MCA, both are master degree courses but MCA is a technical course which includes applications in computer sciences and MBA is a management-oriented course which includes managerial activities, human resource management, finance, banking and marketing.

If we consider the time duration factor to complete the course, then MCA takes one more year than MBA. MCA is a full 3 Years Course which is divided in 6 semesters while MBA is only a 2 Years.

II. SPECIALIZATION

A. Master in Computer Application (MCA)

The MCA course provides students with advanced technical skills like:

- Software Development
- Latest Programming Languages
- Algorithm Design
- Computer Networks
- Database Management

Career options for MCA Graduates:

- Software Engineer/Programmer/Developer
- System Developer/Engineer
- Software Consultant
- Software Tester
- System Analyst
- Trouble-shooter
- Software Application Architect

B. Master in Business Administration (MBA)

The MBA course helps students know about following skills in depth:

- Administration
- Leadership
- Business Skill
- Understanding of Business Economic System

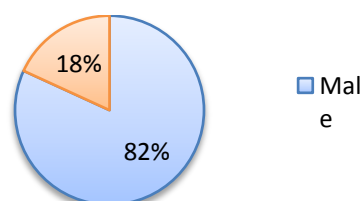
Job Profile for MBA Graduates:

- Business Manager
- Executive Recruiter
- Finance Manager
- Advertising Executive
- Marketing Executive
- Accountant
- HR Professional
- Higher Administrative Positions like CEO

III. SURVEY RESULT

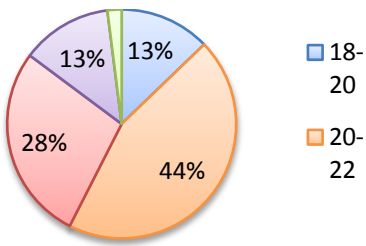
We did a survey on MBA Vs MCA. Here is the result of this survey:

1. Gender



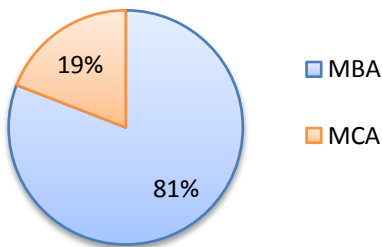
Boys participated more in this survey.

2. Age



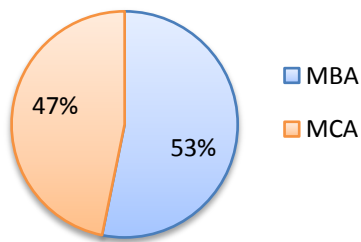
This is the age group of the students who actively participated in this survey.

3. Which one will be best choice for Non-IT background students?



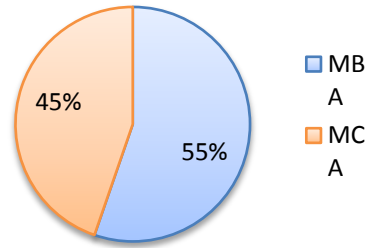
Many students suggested that MBA is a better option for Non-IT background students because MCA is a course fully related to technical field.

4. Which has more job opportunities?



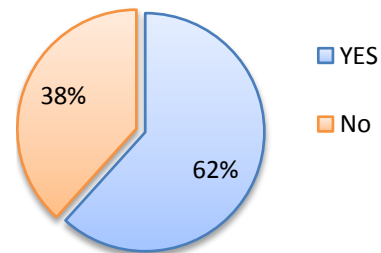
According to the survey conducted, MBA has many fields including IT whereas MCA has only Technical field. So we can easily conclude that MBA has more job opportunities as compared to MCA.

5. Which has more scope in Government sector?



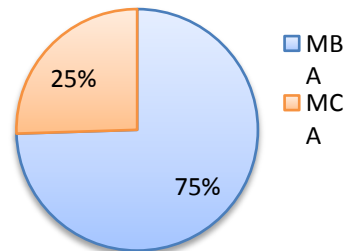
MBA has more scope in government sector than MCA.

6. Which is more difficult?



Many people think that MBA is more difficult as compared to MCA because it includes presentations on regular basis and various case studies.

7. Which offers more salary MBA or MCA?



As compared to MCA, MBA offers more salary packages and has various growth opportunities as well.

8. MBA or MCA, which option is better? And why?

Here is some of the conclusion that we have made based on the reviews of the students:

- With MCA, you can cover various tech-oriented things if you have passion towards coding whereas in MBA you tend to learn various business related skills like leadership, managerial qualities, etc which also helps in personality development of an individual.
- MBA can be suggested to non IT related students whereas MCA is only for IT related students.
- MBA is a much better option as compared to MCA. The growth in industry is preferably

given to MBA students rather than an MCA student.

- d. MBA will definitely leave you with a better package offer.
- e. I think MBA is a better option because there are so many MCA students who are jobless and still looking for job. .IT field is not offering good salary packages.

IV. CONCLUSION

This confusion is never going to be end unless and until students get correct guidance form their teachers and people around them. Most of the student knows where they desire to do in their life, but few are still confused with the changing market requirement.

Few students have a fear of completion level but few get optimistic with the returns they get at the end.

REFERENCES

- [1] <http://www.admission360asia.com/blog/mba-vs-mca-which-one-is-better.html>.
- [2] <http://www.nibs.in/blog/mba-vs-mca-which-is-better-after-bca-or-bsc/>
- [3] <http://www.differencebetween.com/difference-between-mca-and-vs-mba>
- [4] http://www.urpercentile.com/GD_MBAvsMCA.html.

CYBER SECURITY: THROUGH IoT (Internet of Things)

Guided by: Ms. Megha Mudholkar

Urvi Asolkar
TIMSCDR

Poonam Bhagat
TIMSCDR

Shashank Bharwad
TIMSCDR

Abstract- In precise, CYBER SECURITY: THROUGH IOT (Internet of Things), is an idea through which we will propose how to secure our personal belongings against cyber-crime with the help of IOT.

Keywords- Cyber Crime, Cyber Security, IOT, Internet of Things, E-commerce, Social Media, etc.

I INTRODUCTION

In today's world internet is very famous for satisfying people with various services related to various different fields. It is a very capable of doing many functions or facility which can help you in completing many tasks easily and conveniently within few clicks. It may be any work of daily usage or any specific service or function which needs a lot of research and formalities to be done beforehand.

Almost everything is now available over internet in this era of advancement of technologies. It is in general practice nowadays for anyone to look for a particular solution over internet and to get satisfied with the appropriate solution. You can pay your bills online and purchase various products and items by going through various websites and choosing among a variety of options. Information on any particular thing around the world can be found out by anybody (no age barriers included) using internet facility.

Along with the facility of finding various services over internet, one of the most important and popularly rising topics of general interest nowadays is social networking websites (i.e. place where two people or people in groups can talk with each other, no matter where they are at that moment). Nowadays it is very common for people to use social networking websites to be in regular touch with their friends and relatives over internet. Now, this facility can be used to find people who are not in contact with you from a very long time and also of people u didn't know you knew.[1]

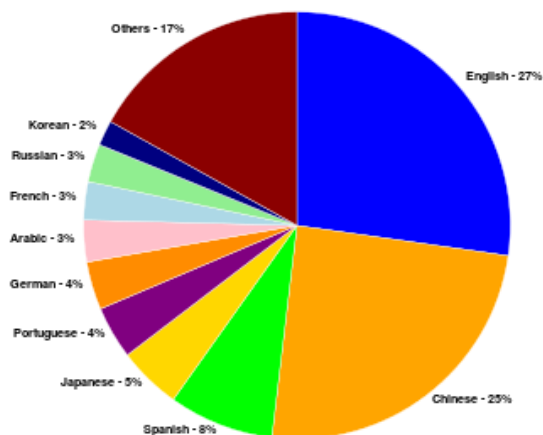


Fig. 1: Users of Internet [2]

II RELATED WORKS

Ms. Sujithra, Dr. G. Padmavathi, proposed in a study of IOT Security Challenges and Issues – An Overview, different techniques and methods to analyse and summarize the security of IOT.

The different security aspects defined in their research includes security bootstrapping and architecture of IOT which provides security at different layers such as network layer and application layer. Using this architecture, we can integrate it with either an IOS app or Android app and take security to the next level. [6]

III USE OF INTERNET

i. Electronic business:

Electronic business (e-commerce) encompasses business processes covering the entire value chain: purchasing, supply chain management, marketing, sales, customer service, and business relationship. It requires the user to share their personal details like passwords and credit card details with the website's database.

ii. Mobile Commerce:

M-commerce (mobile commerce) is the buying and selling of goods and services through wireless handheld devices such as mobile phones and personal digital assistants (PDAs). Known as next-generation e-commerce, m-commerce makes it possible for users

to access the Internet without needing to find a place to plug in.

iii. Social Media

Conventional media, such as television or newspapers, basically transmits information in one direction. The information that the media offers can be consumed by the users, but they have little or no ability to share their own views on the subject. Social media, however, gives users the ability to interact with the content as well as other users that are there on these sites or the content that is being distributed. This communication may be as simple as allowing users to comment on articles or news stories or it can also be complex, such as on Wikipedia, where users can dictate and revise the content contained in encyclopaedia articles.

Other examples of social media allow users to interact with one another by sharing content and voting on its quality, which determines which of the articles rise to the top of the site. Social video sites like YouTube allow users to share video content and interact through video comments and make their own channels, etc.

IV CYBER CRIME

Computer crime, or cybercrime, is crime that involves a computer and a network together. The computer may have been used in the committing the crime, or it may be the target. It can be classified into:

i. Fraud and Financial crimes

Computer fraud is any false misrepresentation of fact intended to let another to do or stop from doing something which causes loss. These crimes mostly involve hacking of e-commerce websites or false use of mobile devices or other handy devices.

ii. Cyber Extortion

Cyber extortion occurs when a website, e-mail server, or computer system is subjected to or threatened with repeated denial of service or other attacks by deliberately harmful hackers. These hackers may demand money in return for promising to cease the attacks and to offer "protection". [3]

iii. Cyber Warfare

Cyberwarfare is Internet-based conflict involving politically motivated attacks on information and information systems. Cyberwarfare attacks can disable official websites and networks, disrupt or disable essential services, steal or alter classified data, and cripple financial systems -- among many other possibilities.

iv. Computer as a Target

These crimes are commissioned by a selected group of criminals. Unlike crimes using the computer as a tool, these crimes require the technical knowledge of the one who commits the offense or crime. As such, as technology evolves, so too does the nature of the crime. These crimes are relatively new, having been

in existence for only as long as computers have— which explains how unprepared society and the world in general is towards battling these crimes. There are numerous crimes of this nature committed on a regular basis on the internet. [4]

V CYBER SECURITY

Computer security, also known as cybersecurity or IT security, is the protection of information systems from theft or damage to the hardware, the software, and to the information on them, as well as from disruption or misdirection of the services they provide. Few measures to protect our privacy are:

1. Read privacy policy carefully when you submit the data through internet.
2. Encryption: A lot of websites uses SSL (Secure Socket Layer) to encrypt the data.
3. Disable remote connectivity.
4. Insert firewall and popup blocker.
5. Uninstall unnecessary software.

The only system which is truly secure is the one which is switched off and unplugged. So, the only way to stay safe is to pay attention and act smart. [5]

VI IOT (Internet of Things)

The internet of things (IOT) is the internetworking of physical devices, vehicles (also referred to as "connected devices" and "smart devices"), buildings and other items— embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects for collection and exchange data.

"Things" in the IOT sense, can refer to a wide variety of devices such as heart monitoring implants, biochip transponders on farm animals, electric clams in coastal waters, automobiles with built-in sensors, DNA analysis devices for environmental/food/pathogen monitoring or field operation devices that assist firefighters in search and rescue operations. Legal scholars suggest to look at "Things" as an "inextricable mixture of hardware, software, data and service".

These devices collect useful data with the help of various existing technologies and then autonomously flow the data between other devices. Current market examples include home automation (also known as smart home devices) such as the control and automation of lighting, heating (like smart thermostat), ventilation, air conditioning (HVAC) systems, and appliances such as washer/dryers, ovens or refrigerators/freezers that use Wi-Fi for remote monitoring.

VII CYBER SECURITY USING IoT

• Problem:

For example, you may have a number of devices connected to together via the internet, like your refrigerator, AC, lights or more important things like your laptop, home security locks, etc.

All these things will be connected to your phone and you can access it with one touch to your phone expecting that you know the password of your Wi-Fi.

Now assume you have no security to your WI-FI system and somebody tries to hack into your system he may easily get access to your house and he also will be able to access your laptop which may give away your personal information if it is also not secured.

• **SOLUTION:**

You may have a password written to even access your Wi-Fi, whenever someone tries to breach or hack into your system it will send a message to your mobile that someone is trying to by wrong means gain access to your things.

Now if you have an idea of what is going on you may ignore the message but if you feel if it's a real threat and someone is trying to get into your house or your workplace, you may trigger an alarm which is connected with your power supply system and will switch off power supply indirectly denying the unauthorized person access.

This application will provide two-way security, one will be voluntary i.e. application provides means to voluntarily lock the house engage the alarm system, turn on the security cameras within the house at strategic locations. The passive security aspect will be that if after the alarm is engaged someone hacks into the system or tries to manually get into the immediately SOS message will be sent to few trusted friends and local authorities. User will however have a chance to look in the camera about who is entering the house or who is standing in front of the door, if the person is trust worthy user can allow the person to enter by disengaging the lock.

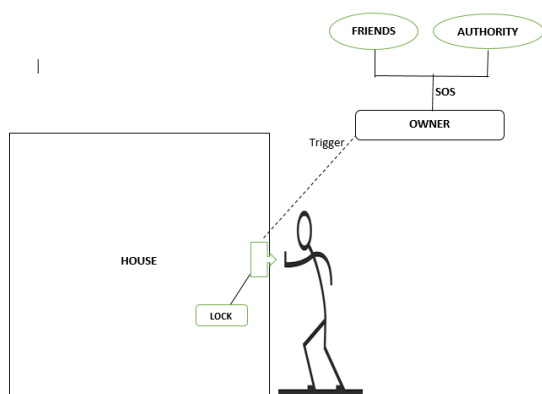


Fig. 2: Proposed System Overview

VIII CHALLENGES

One of the pitfalls of the previous works is that they assume that basic necessities like electricity wireless networks the security algorithm, etc. will flawlessly work for their solution to succeed. However, there will certain cases where the basic framework may be down, wireless could be disconnected or some natural calamity like a

storm would s=disrupt the services how in that case, manual security and checking will still be required.

Along with the disruptions in electricity, there are problems that may arise in the presence of electricity and proper WIFI working:

1. User has to always keep a track of who will be entering the house and when they will be entering the house.
2. If the hacker is smart enough and he formats your system even before the trigger is sent, then you will never know that your house is getting attacked.
3. Along with the code, if your lock system has biometric security system then it will make attacking for the hacker even more challenging. But including biometrics in IOT and checking every time before sending the trigger will also be tedious job.
4. We even have to keep a track of mode through which message will be sent (normal messaging, internet messaging). We even have to secure the trigger against susceptible attacks.

IX CONCLUSION

However, we pretty sure that this endeavour with time will be a good success as there is enough scope and a big need for security in places where ever IOT exist.

Cyber Crime in general at this point is quite speeded and secure measures are being taken. With time it'll surely be beneficial to the masses as it we will be at least somewhat prepared for the attack on our home appliances or even at our house as its better than being totally negligent.

ACKNOWLEDGMENT

It gives us immense pleasure to present this Research Paper. We grab this opportunity to express our heartfelt obligation towards the people without whom completion of this Research Paper have not been possible. We would like to thank our guide Prof. Megha Mudholkar for her immense support and continuous encouragement to our team.

REFERENCES

- [1] <http://www.selfgrowth.com/articles/importance-of-internet-in-today-s-world>
- [2] <https://en.wikipedia.org/wiki/Internet>
- [3] <https://en.wikipedia.org/wiki/Cybercrime>
- [4] https://en.wikipedia.org/wiki/Computer_security
- [5] <http://www.slideshare.net/bijayguyz/cyber-security-prt>
- [6] Ms. Sujithra and Dr. G. Padmavathi, IOT Security Challenges and Issues – An Overview (World Scientific News 41 (2016))

Biometrics Security System

Guided by: Ms. Sonam Pareek

Tanushree Kumar
TIMSCDR.

Krishnakant Maurya
TIMSCDR.

Mohnish Masdekar
TIMSCDR.

Abstract: Biometrics security is a security mechanism used for authentication that provide access to a facility or system based on the automatic and instant verification of individual's physical characteristics. Because biometric security evaluates an individual's bodily elements or biological data, It is the strongest and most foolproof physical security technique used for identity verification. In this paper we will learn how the modern world is rapidly turning towards the use of Biometric security .Biometric security is that advanced that it becomes very hard for the intruder to gain access of the system.

Keywords:-Biometrics security system, recognition methods, identification, facial recognition, fingerprint reader, voice recognition, iris/retinal recognition, vein recognition, DNA recognition.

I. INTRODUCTION

Biometrics is defined as the unique (personal) physical/logical characteristics or traits of human body. These characteristics and traits are used to identify each individual. Any details of the human body which differs from one human to other will be used as unique biometric data to serve as that person's unique identification (ID), such as: retinal, iris, fingerprint, palm print and DNA. Biometric systems will collect and store this data in order to use it for verifying personal identity. The combination of biometric data systems and biometrics recognition/ identification technologies creates the biometric security systems. An individual's body characteristics are pre-stored in a biometric security system or scanner, which may be accessed by authorized personnel. When an individual tries to gain access to a system, the biometric scanner evaluates his/her physical characteristics, which are then matched with the stored records. If a match is located, the individual is granted access.

Biometrics is the study of measurable biological characteristics. There are several types of biometric identification schemes: facial characteristics, fingerprints, hand geometry, retina and iris scanning, capillary mapping, voice and signature recognition.

II. BIOMETRICS SOLUTION

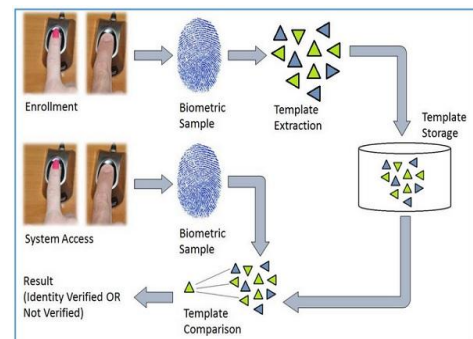
i. Facial Recognition:

Face recognition is a very popular technology and is more widely used as it doesn't require any kind of physical contact between the individual and the

device. The camera first scans the user's face and matches it with the database record for verification. The Biometric face recognition system will collect the features from the user's face and store them in a database for future use. The Face recognition system will measure the features such as the distance between eyes, nose, mouths, ears, jaw, size of eyes, mouth and others expressions. Facial expression is also counted as one of the important factors to change during a user's facial recognition process.

ii. Fingerprint reader:

A fingerprint reader considers the uniqueness of the fingerprint by determining the different patterns of the ridges and furrows as well as the minutiae points. There are five basic patterns which constitute a fingerprint which are: the arch such as tented and plain arch covers 5% of fingerprint; left and right loop covers 60% of fingerprints; whorl covers 34% of fingerprints and accidental whorls covers 1% of fingerprints.



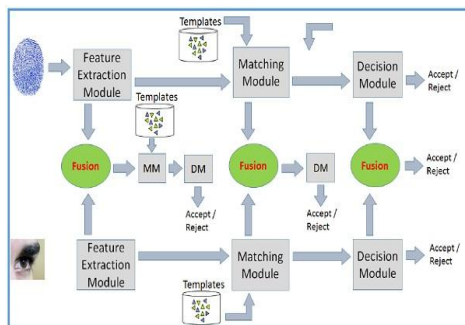
iii. Voice Recognition:

Biometrics technology created voice recognition systems to give access to an individual using his/her voice. Mainly, voice recognition will focus on the vocal tract because it is a unique identity of a person. A person's voice is matched with the voice recorded in the database and accordingly access is granted.

iv. Iris Scanner & Recognition:

The human iris is a thin circular structure which is responsible for controlling the total diameter and the total size of the pupils. It also controls the amount of light which is allowed through the retina in order to protect the eye's retina. It also controls the total amount of light which is allowed to pass

through the retinal in order to protect the eye's retina. Iris color is also different from person to person and depends upon their genes. Iris color will decide the color of the eye c for each and every individual. There are several iris colors such as: brown (which is the most popular color for the iris), green, blue, grey, hazel (the combination of brown, green and gold), violet, pink (in really rare cases). The iris has its own patterns from eye to eye and from person to person which makes up the uniqueness of an individual. The retina scanning is done and accordingly is matched with the record in the database and decision is taken whether to accept or reject.



v. Veins Recognition:

Veins are blood vessels that carry blood to the heart. Each person's veins are having very unique physical and behavioral properties. Thus taking advantage of this, biometrics system uses unique characteristics of the veins as a way to identify the user. Vein recognition systems mainly focus on the veins in the user's hands. Each finger on human hand has veins which are connected directly with the heart and it has its own physical properties.

vi. DNA Biometrics System:

Each individual's DNA contains some traits from his/her parents. Each cell in the human body contains a copy of this DNA. Accordingly DNA profiling is done. DNA profiling will decide whether the amount of VNTR (variable number tandem repeat) which repeats at a number of distinctive loci. These amounts of VNTR will make up an individual's DNA profile.

III. ADVANTAGES OF BIOMETRICS SYSTEM

The advantage of using Biometric system is its uniqueness, which is the reason it is in demand in today's world and has become an important part of our lives. Another advantage of using biometric system is the highly secure way of identifying users, which make this technology less prone for users to share access to

high sensitive data. One more reason for biometric system for being so popular is because the identification of an individual through biometrics cannot be lost or stolen or forgotten.

IV. DISADVANTAGES OF BIOMETRIC SYSTEM

Suppose if an individual loses his/her finger in an accident then it can be a problem to fingerprint recognition verification process. During voice recognition illness such as strep throat may create a problem during the verification process and make it hard for the authorized users to get access to their particular information. Background noise as well as continuous aging of users also makes it difficult for the voice recognition system to verify the voice.

V. BIOMETRICS FUTURE VIEW

Fingerprint capillary mapping is one of the areas that show great promise, and this technique is spreading rapidly. Facial recognition combined along with action identification technology is another powerful tool that is increasingly being used in different sectors of the industry. This technology is used in the London subway system to monitor identity of the passengers and their behaviors.

The lack of a universal technology standard for back-end biometrics software has slowed down the adoption of biometrics system. Manufacturers' technologies are not necessarily interchangeable or interoperable, which means that adopters – for now – are resistant to change once they have invested in a system. There is considerable work to be done on this front, but as standards improve and evolve considerably and understanding of biometrics mechanism benefits grows, adoption of the technology is expected to grow exponentially and put into practice.

i. Biometrics technology affects to our life:

Biometrics technology provides us various new inventions which improves both the quality and the longevity of our lives. In today's world biometrics technology is considered to be one of the best protection methods of user information and data, etc. Biometrics technology usually collects and then measure the data of human physiology and behavior. Biometrics technology is more efficient and convenient than other technologies of identity authentication. Such as, ID card (student IDs in school) is one of the examples to authenticate a user's identity. In case you forget your ID card at home then you will not be granted access to school building. In this case, biometrics system will be

more efficient and useful because there are almost no chances that you forgot your eyes or fingers at home. With biometrics security system, we only need to verify our identity by the unique characteristics that are always with us reducing the instances of losing ID cards and other identifying properties. Biometrics technology is applied in a variety of ways and is put in to practice in various fields. For example, we can see that it is applied in hospitals to verify the identity of patients and to protect their privacy. Furthermore, biometrics technology has also been used at airports to verify the identity of those who are nearby to airport. By using this technology, it helps the government to keep track of people going in and out of the country. It also helps to identify various criminals and terrorists.

ii. **Biometrics applies in network security:**

The major problem for network security is the authentication system. For most systems, they mainly use and rely on passwords which is the mixture of special character's letters, and/or numbers. However, passwords need to be renewed within a certain period of time to maintain the level of security and keep your account/information safe. Moreover, it might be copied and used by unauthorized users by hacking or using other techniques. To fix this problem, biometrics security system came into use. The most use of biometrics security system in network is the logical access control method, which use an individual's physical properties. It will verify person's identification for secure workstation logon or network logon to get access control to the system.

VI. BIOMETRICS TECHNOLOGY CONCERNS

There are three main concerns about this new-born technology like: Information Privacy, Physical privacy and religion objections.

Information privacy: In Information Privacy there are threats (function creep and tracking capabilities of biometrics system) that are concerns affecting the privacy of information/data of users.

There are some religious groups that believe barcodes on users is "the Mark of the Beast" and can represent a number of evils which is hindering the progress of the system as a whole. For religious objections, governments must take this problem seriously and find the corresponding solutions for the biometrics technology in order to spread its use in every area of the world.

VII. CONCLUSION:

There is no doubt that biometrics has significant potential in health care, in facilitating cost reductions, enhancing information security, increasing the services quality, improving accessibility, and even greater geographic equity of delivery.

In conclusion, biometrics technology is a new technology for most of us because it has only been implemented in public for short period of time. There are many applications and solutions of biometrics technology used in security systems. It has many advantages which can improve our lives such as: improved security and effectiveness, reduced fraud and password administrator costs, ease of use and makes live more comfortable. Even though the biometrics security system still has many concerns such as information privacy, physical privacy and religious objections, users cannot deny the fact that this new technology will change our lives for the better.

ACKNOWLEDGMENT

It gives us immense pleasure to present this Research Paper. We grab this opportunity to express our heartfelt obligation towards the people without whom completion of this Research Paper have not been possible. We would like to thank our guide Prof. Sonam Pareek for her immense support and continuous encouragement to our team.

REFERENCES

- [1] www.nuance.com
- [2] www.biometricupdate.com
- [3] www.techopedia.com
- [4] www.study.com
- [5] www.biometricsinstitute.org
- [6] www.findbiometrics.com
- [7] AtulKahate "Cryptography And Network Security"
- [8] William Stallings "Cryptography And Network Security"
- [9] Eric Cole "Network Security Bible"

Success Rate Of Software Projects: A Comparative Study

Guided by: Ms. Jayashree Jain

Anagha Patwardhan
TIMSCDR.

Radhika Khapre
TIMSCDR.

Shraddha Mhatre
TIMSCDR.

Aishwarya Mungekar
TIMSCDR.

Abstract: This paper describes the fraction or a percentage of software projects getting successful and helps to have a comparative study of a success/failure rate.

Keywords: - Comparative study, success rate, Software y

I. INTRODUCTION

Despite over half a century of Project Management research, project success rates are still too low. Organizations spend a tremendous amount of valuable resources on Software projects and seek to maximize the utility gained from their efforts.

The term 'Software Crisis' describes that the software industry's inability to provide customers with high quality products within schedule and under budget. Even though Hardware costs are dropping but software costs are rising rapidly. Major computer system projects are sometimes years late, and the resulting software is unreliable, hard to maintain and performs poorly.

The observation uncovered the reasons for low success rate are:

- A. Specification and design errors in the software.
- B. Poor analysis of the failed subsystems.
- C. Testing of the failed subsystems.

Some Software project gets completed but not successfully because of exceeding the budget and Schedule. "One main reason for the delay and overrun was the presence of major bugs in the software" In the United States (US), a survey conducted by The Standish Group in 1994, which reported data from several IT projects, revealed a success rate of only 16% of software projects. Meanwhile, 31% of projects failed while the remaining 53% had cost overruns, time overruns and impaired functionality. Of these, the average cost overrun was 189%, and the average time overrun was 222%.

II. COMMON REASONS FOR FAILURE OF PROJECT

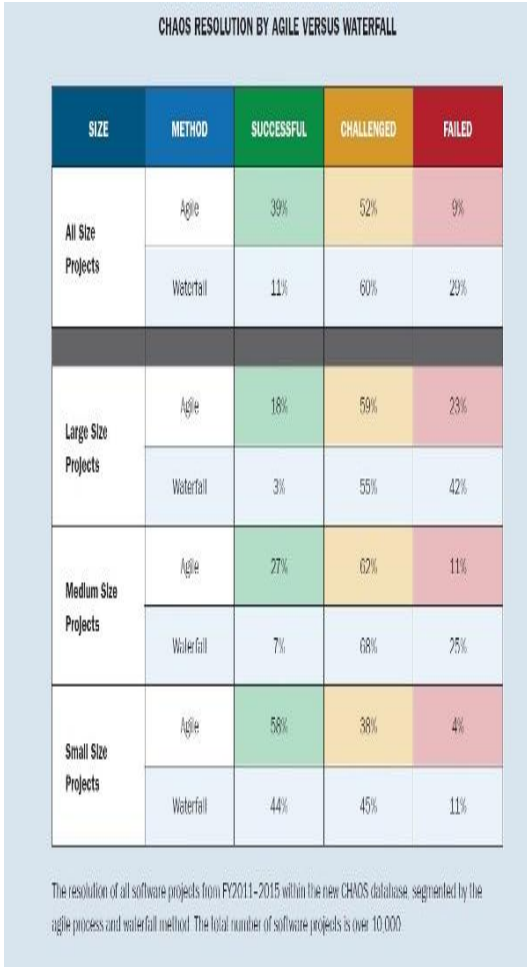
- A. Acceptance of a forced schedule or milestone dates without having substantial data and analysis.

- B. Addition of excessive personnel for achieving unrealistic schedule compression.
- C. Failing to account and adjust for requirements growth or change and making necessary adjustments for scheduling and budgeting forecasts.
- D. Poor level of preparation and inadequate documentation and tracking.
- E. Failure to define the parameters and enforcing them.

III. FACTORS AFFECTING SUCCESS OF PROJECT

- i. **Good planning** – It includes detailed planning of the process implementation stages, task timeliness, fallback positions, and re-planning. The project manager who does not prepare to re-plan, or has not considered and planned fallback positions when initial plans fail, will often find that the project first stalls, and then fails.
- ii. **Clear responsibility and accountability of team members** -This requires that all team members have a clear understanding of their roles and duties in the project.
- iii. **Schedule control**–It includes continuous monitoring and measurement of time, milestones, people, and equipment schedules.
- iv. **Executive support**-When an executive or group of executives are able to provide both financial and emotional backing. That is, they will encourage and assist in the successful completion of the project.
- v. **Stakeholder's satisfaction**-Stakeholder's satisfaction is a must for considering a project successful. Requirements presented by the Stakeholders should be achieved efficiently.
- vi. **Risk management**-During the process of planning, it is vital to produce a risk log with an action plan for the risks that the project could face. If something happens, then the team can quickly resolve the issue with the management plan that has already been set in place.

- vii. **Strong project closure** -If a project does not have strong closure, then it has the potential to continue to consume resources. The project team must be firm and agree with the customer that all critical success factors have been met.



As we take up agile process rather than traditional waterfall method, Standish group observes the increase in success rate of software project. Across all project sizes agile approaches resulted in more successful projects and less outright failures, as shown in above table.

IV. COMPARISON OF SOFTWARE PROJECTS

	ANDROID	WINDOWS
Device Compatibility	Android phones provide.	Windows Phone didn't provided the needed developer APIs to efficiently manage smart devices.

A. Customizability	In android phones, we can easily customize our phone according to one's liking.	If we want to change an aspect of the phone, say the keyboard, there are no options to swap it out for another. Microsoft has made sure that core system components can't be changed
B. Multitasking	Don't have a shallow limit like windows phones.	Windows Phone places a limit on the number of applications you can run in the background.
C. Adoption Rate	Have fast adaptation rate.	Slow adoption of an operating system inflicts consumer experience.

- Reason for android success

The NOKIA who develop smart phones working on windows operating system could not cope with ANDROID phones and they even stick with windows based phones. Over a period of time, the companies like one plus, Lenovo, lava etc. gained their place in market by developing phones on high demand operating system ANDROID and because of this the market value of NOKIA phones starts decreasing. The market share for android and windows is shown in above chart.

V. FORECAST OF TOP SMARTPHONE OPERATING SYSTEM

Top Smartphone Operating Systems, Forecast Market Share and CAGR, 2013-2017

Smartphone OS	2013 Market Share	2017 Market Share
Android	75.3%	68.3%
iOS	16.9%	17.9%
Windows Phone	3.9%	10.2%
BlackBerry OS	2.7%	1.7%
Others	1.2%	1.9%
Totals	100.0%	100.0%

Many of the core features of Android and Windows Phone are very similar. For example, swiping down from the top of the screen on either OS will show you any notifications and give you access to quick settings.

Both operating systems also have a deeper settings screen and an app drawer, to hide away any apps that you don't want to see front and

VI. ACKNOWLEDGMENT

It gives us immense pleasure to present this Research Paper. We grab this opportunity to express our heartfelt obligation towards the people without whom completion of this Research Paper have not been possible. We would like to thank our guide Prof. Jayashree Jain for her immense support and continuous encouragement to our team.

REFERENCES

- [1]. <https://project-management.com/five-factors-that-lead-to-successful-projects/>
- [2]. <https://www.infoq.com/articles/software-failure-reasons>
- [3]. <http://www.businesstoday.in/current/windowsvsandroids.html>

Network Security with Cryptography

Guided by: Ms. Megha Mudholkar

Kajal Choudhary

Virendra Choudhary

Hitesh Daiya

TIMSCDR

TIMSCDR

TIMSCDR

Abstract-Network Security and Cryptography is an idea to ensure system and information transmission over remote system. Information Security is the principle part of secure information transmission over inconsistent system. Organize security includes the approval of access to information in a system, which is controlled by the system manager. Clients pick or are allocated an ID and secret key or other validating data that permits them access to data and projects inside their power. Arrange security covers an assortment of PC systems, both open and private, that are utilized as a part of ordinary employments leading exchanges and correspondences among organizations, government offices and people. Systems can be private, for example, inside an organization, and others which may be interested in free. Arrange security is included in associations, ventures, and different sorts of foundations. In this paper we additionally contemplated cryptography alongside its standards. Cryptographic frameworks with figures are portrayed. The cryptographic models and calculations are plot.

Keywords- Network, Security, Cryptography

I. INTRODUCTION

Arrange Security is the most essential part in data security since it is in charge of securing all data went through organized PCs. Organize Security alludes to all equipment and programming capacities, attributes, highlights, operational strategies, responsibility, measures, get to control, and regulatory and administration strategy required to give a worthy level of insurance for Hardware and Software, and data in a system. Organize security issues can be isolated generally into four nearly interlaced territories: mystery, confirmation, non-repudiation, and trustworthiness control. Mystery, likewise called privacy, needs to do with keeping data out of the hands of unapproved clients. This is the thing that more often than not strikes a chord when individuals consider arrange security. Validation manages deciding whom you are conversing with before uncovering touchy data or going into a business bargain. Non repudiation manages marks. Message Integrity: Even if the sender and beneficiary can validate each other, they likewise need to guarantee that the substance of their correspondence is not changed, either maliciously or unintentionally, in transmission. Expansions to the check summing

methods that we experienced in dependable transport and information interface conventions. Cryptography is a developing innovation, which is critical for system security. The broad utilization of mechanized information stockpiling, handling and transmission makes delicate, significant and individual data defenseless against unapproved get to while away or transmission. Because of proceeding with headways in correspondences and listening stealthily innovations, business associations and private people are starting to secure their data in PC frameworks and systems utilizing cryptographic strategies, which, until as of late, were solely utilized by the military and political groups. Cryptography is a crucial of today's PC and correspondences systems, shielding everything from business email to bank exchanges and web shopping while established and present day cryptography utilize different scientific strategies to maintain a strategic distance from busybodies from taking in the substance of scrambled messages. PC frameworks and systems which are putting away, preparing and imparting delicate or important data require insurance against such unapproved. The main general way to deal with sending and putting away information over media which are shaky is to utilize some type of encryption. An essential concern is that numerous assaults include mystery way access to data assets, and associations are frequently unconscious of unapproved access to their data frameworks. Consequently the quantum cryptography utilized. The security of quantum cryptography keeps up in its capacity to trade the encryption key with total security. Cryptography has its cause in the old world. As per the Julius Caesar, we should utilized straightforward cryptography to conceal the significance of his messages. The Caesar figure is a mono alphabetic cryptosystem, since it replaces every given plain content letter, wherever in the first message it happens, by similar letter of the figure content letters in order. However the ideas of source and collector, and channel codes are cutting edge thoughts that have their underlying foundations in the data hypothesis. Claude Shannon, in the 1948 gave the data hypothesis premise to mystery, which characterizes that the measure of instability that can be brought into an encoded message can't be more noteworthy than that of the cryptographic key used to encode it. Claude Shannon introduced this idea of security in correspondences in 1949, it infers that an encryption plan is consummately secure if, for any two messages M_1 and M_2 , any figure content C has

similar likelihood of being the encryption of M 1 just like the encryption of M 2. Shannon was created two imperative cryptographic ideas: disarray and dispersion. As indicated by Salomon, the term perplexity intends to any strategy that makes the measurable relationship between the figure content and the key as troublesome as could be allowed, and dissemination is a general term for any encryption method that grows the actual properties of the plain text over a scope of bits.

II. LITERATURE REVIEW

i. **Implementation of AES Using S-Box Rotation:**

AES algorithm is also known as a secured algorithm. S-box and key used have some security problems. In this paper focus is on the S-box rotation so that we get highly secured information. Earlier the standard AES consists of four stages while in the new design, there is a five stages and the extra stage is known as S-box rotation. Implementation of proposed work and experimental results are to be discussed.[7]

ii. **FPGA Implementation of Reconfigurable Parameters AES Algorithm:**

In this paper, a novel method of using customized (AES) variable parameters is introduced. This method depends on a continuous parameters reconfiguration and a customization of each internal block. The customization depends on varying the four transformations (polynomial and affine transformations for S-Box (SB), Shift Rows (SR) transformation, and Mix Column (MC) transformation). Internal AES blocks (SB, SR, and MC) are varied each round. Furthermore, these blocks are randomly interconnected during each session. The ciphered output was tested using avalanche, strict avalanche, and other NIST tests. This method overcomes (ECB) mode problems which appear when there is high redundancy in the plain data and also increasing strength against brute force attacks. The proposed AES is implemented on Field programmable Gate Arrays (FPGAs) [8].

iii. **An Overview of Cryptanalysis Research for the Advanced Encryption Standard:**

Since it's released in November 2001, the Advanced Encryption Standard (NIST FIPS-197) has been the subject of extensive cryptanalysis research. This research importance has intensified since AES was named as a Type-1 Suite B Encryption Algorithm (CNSSP-15), in 2003, by NSA. As such, AES is now authorized to protect classified and unclassified national security systems and information. An overview of current cryptanalysis research on the AES cryptographic algorithms provided by the paper on the impact discussion is provided by each technique to the strength of the algorithm in national security applications. The conclusion of this paper with an attempt at a

forecast of the usable life of AES in these applications [9].

A Review depends on Various Most Common Symmetric Encryptions Algorithms. Security is the most challenging aspects in the internet and network application. In applications like internet and network are growing very fast, so the importance of the exchanged data over the internet or other media types is increasing. In data communication, information security is utmost issue. A great loss to the organization can be caused by loss or threat to information. A main role is played by Encryption technique in information security system. A comparison of various encryption algorithms is given by this paper and then finds best available one algorithm for the network security [10].

A Study of 3DES, DES, RSA and AES., in today world importance of exchange of data over internet and other media type is eminent; the search for best data protection against security attacks and a method to timely deliver the data without much delay is the matter of discussion among security related communities. Cryptography is a method which provides the security mechanism within timely driven fashion. Usually, Cryptography is attached to the definition of encryption, referred to as "the study of secret". Characteristic that identified and differentiated encryption algorithm from another is their capability to secure the protected data against attacks and their speed and effectiveness in securing the data. Comparative study is provided by this paper between four such widely used encryption algorithms 3DES, AES, RSA & DES on the basis of their ability to secure and protect data against attacks and speed of encryption and decryption [11].

iv. **Efficient Implementation of AES:**

With the fast progression of digital data exchange in electronic way, in data storage and transmission, information security is becoming much more important. A solution is present for cryptography which plays a vital role in information security system against various attacks. Some algorithms is used in this security mechanism uses to scramble data into unreadable text which can be only being decoded or decrypted by party those possesses the associated key. Two types of cryptographic techniques are being used: symmetric and asymmetric. In this paper we have used symmetric cryptographic technique AES (Advanced encryption standard) having 200 bit block as well as key size. And the same conventional 128 bit conventional. using 5*5 Matrix AES algorithm is implemented for 200 bit. On implementing, the proposed work is compared with 256 bit, 192 bits & 128 bits AES techniques on two points. These points are encryption and decryption time and throughput at both encryption and decryption sides [12].

v. **Efficient Data Hiding By Using AES & Advance Hill Cipher Algorithm:** This paper proposed a data hiding technique using AES algorithm. The two popular ways of sending vital information in a secret way is Stenography and Cryptography. For making data secured cryptography was introduced. Cryptography cannot provide a better security approach because the scrambled message is still available to the eavesdropper. a need of data hiding arises. So, by combining the stenography and cryptography, the security can be improved. many cryptography techniques are available here; among them AES is one of the most useful techniques .In Cryptography, use of AES algorithm to encrypt a message using 128 bit key the message is hidden . In this proposed technique, use of advance hill cipher and AES to enhance the security level which can be measured by some measuring factors. The result shown by this work is advance hybrid scheme gives better results than previous [13].

III. NETWORK SECURITY

"**Network security**" refers to any activity designed to protect the use of ability and integrity of our network and data. It includes both hardware and software technologies. Effective network security manages access to the network. It targets a variety of threats and stops them from entering or spreading on your network.[4]

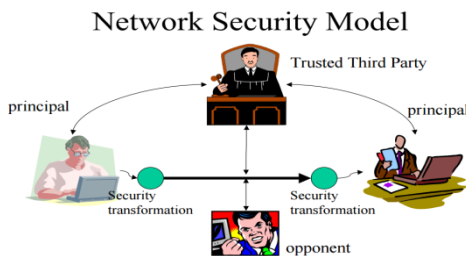


Fig. 1: Network Security Model [6]

- **How does network security work?**
Network security combines multiple layers of defenses at the edge and in the network. Each network security layer implements rules and controls. Authorized users gain access to network resources, but malicious actors is blocked from carrying out exploits and threats.
- **How do I benefit from network security?**
Digitization has changed our world. How we live, work and play have all changed. Every organization that wants to deliver the services that customers and employees demand must protect its network. Network security also helps you protect proprietary information from attack. Ultimately it protects your reputation. [4]

IV. CRYPTOGRAPHY

Cryptography is the art of achieving security by encoding messages to make them non readable.

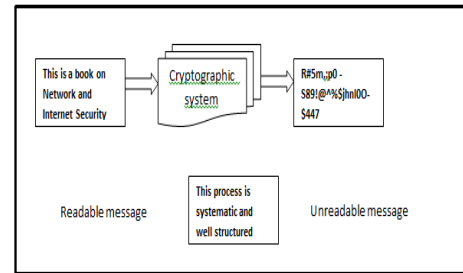


Fig. 2: Cryptographic System

- **What Is Cryptography?**
Cryptography is the science of providing security for information. It has been used historically as a means of providing secure communication between individuals, government agencies, and military forces. Today, cryptography is a cornerstone of the modern security technologies used to protect information and resources on both open and closed networks. [3]
- **Basic Components of Modern Cryptography**
Modern electronic cryptosystems use complex mathematical algorithms and other techniques and mechanisms to provide network and information security. Cryptography-based security technologies commonly use one or more of the following basic components to provide security functions:
 - Encryption algorithms
 - Message digest functions
 - Hashed Message Authentication Code (HMAC) functions
 - Secret key exchange algorithms
 - Digital signatures
- **Plain Text and Cipher Text:**
Clear text, or Plain text, signifies a message that can be understood by the sender, the recipient, and also by anyone else who gets access to that message.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
D	E	F	M	N	O	Q	R	S	U	V	W	P	H	I	J	X	Y	Z	K	L	T	G	A	B	C

Fig.3: A scheme for codifying messages (replacing each alphabet with an alphabet three places down the line)

Thus, using the scheme of replacing each alphabet with one example, a message Kajal Choudhary will become VDUDW ZRILMRDYB

K	A	J	A	L		C	H	O	U	D	H	A	R	Y
V	D	U	D	W		Z	R	I	L	M	R	D	Y	B

Fig.4: Codification using the alphabet-replacement scheme

When a plain-text message is codified using any suitable scheme, the resulting message is called cipher text. [3]

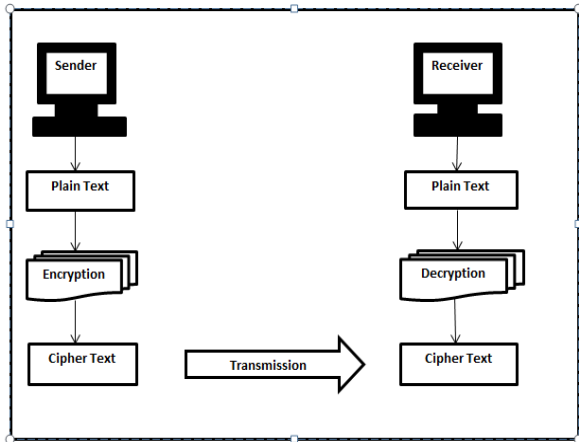


Fig.5 : Elements of a cryptographic operation

V. ENCRYPTION AND DECRYPTION

In technical terms, the process of encoding plain text into cipher text messages is called **Encryption**

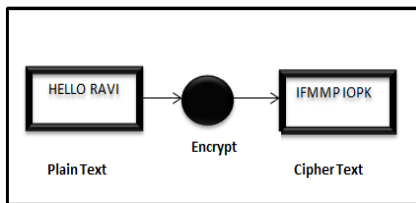


Fig.6 : Encryption

The reverse process of transforming cipher-text messages back to plain text message is called Decryption [3]

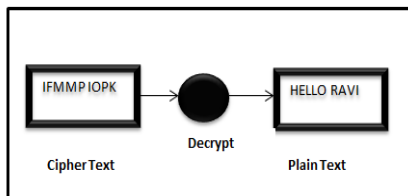


Fig.7: Decryption

VI. CRYPTOGRAPHIC PRINCIPLES

A. REPETITION

Cryptographic principle 1: The first principle is that all encrypted messages must contain some redundancy, that is, information not needed to

understand the message. Messages must contain some redundancy.

B. FRESHNESS

Cryptographic principle 2: Some method is needed to foil replay attacks. One such measure is including in every message a timestamp valid only for, say, 10 seconds. The receiver can then just keep messages around for 10 seconds, to compare newly arrived messages to previous ones to filter out duplicates. Messages older than 10 seconds can be thrown out, since any replays sent more than 10 seconds later will be rejected as too old.

VII. BASIC STEP-BY-STEP PROCEDURE FOLLOWED BY NETWORK SECURITY AND CRYPTOGRAPHY

Stage 1:

- Activation: a man ought to designate for uninvolved information gathering which is required here.
- Obtaining information: the gadget being utilized for gathering information ought to store data for later survey and conveyance.
- Wrap information: information to be transmitted is appropriately bundled.

Stage 2:

- Delivery: an electronic medium is decided for transmission of the packaged data.
- Receipt: An affirmed outcast than gets to the data for further examination.
- Indicators: benchmarks are made and open results are taken a gander at against them. Any odd development viewed is no ifs and or but highlighted.

Stage 3:

- Observation and Review: the information made accessible is to be screened, analyzed and legitimately arranged for future reference.
- Alert strategy: here, a caution is readied that would be sent by means of telephone or an email. Legitimate contact points of interest are required. It is consequently vital that honest to goodness information be gathered from the client for this stage.

Stage 4:

- Alert sent: Alert is sent to persistent furthermore quick individuals for the patient i.e. colleague, family, the specialist.

Stage 5:

- Treat and Adjust: here, the specialists, family intercede in patient action to give help and treatment.
- Educate: The specialists likewise instruct the family and quick help at the patient's place of how to react when comparative circumstance emerges later on. [1]

VIII. CRYPTOGRAPHIC MODEL AND CALCULATION

Encryption display there are two encryption models to be specific they are as per the following: Symmetric encryption and Asymmetric encryption. In Symmetric encryption, Encryption key = Decryption key. In Asymmetric encryption, Encryption key Decryption key.

Calculations there are obviously an extensive variety of cryptographic calculations being used. The accompanying are amongst the most understood:

- 1) DES: This is the 'Information Encryption Standard'. This is a figure that works on 64-bit squares of information, utilizing a 56-bit key. It is a 'private key' framework. Assist Details on the DES Algorithm.
- 2) RSA: RSA is an open key framework outlined by Rivets, Shamir, and Adelman. Advance Details on the RSA Algorithm.
- 3) HASH: A 'hash calculation' is utilized for processing a consolidated representation of a settled length message/record. This is here and there known as a 'message process', or a 'unique mark'.
- 4) MD5: MD5 is a 128 piece message process work. It was created by Ron Rivets. Assist Details on the MD5 Algorithm.
- 5) AES: This is the Advanced Encryption Standard (utilizing the square figure) endorsed by NIST.
- 6) SHA-1: SHA-1 is a hashing calculation comparable in structure to MD5, yet delivering a process of 160 bits (20 bytes). Because of a process of 160 bits (20 bytes). Because of the expansive process estimate it is more outlandish that two distinct messages will have similar SHA-1 message process. Hence SHA-1 is prescribed in inclination to MD5. [2]

IX. CONCLUSION

Arrange Security is the most essential part in data security since it is in charge of securing all data went through organized PCs. Organize security comprises of the arrangements made in a basic PC organize base, approaches received by the system head to ensure the system and the system open assets from unapproved get to, and steady and nonstop checking and estimation of its viability (or need) joined together. We have considered different cryptographic strategies to build the security of system. Cryptography, together with reasonable

correspondence conventions, can give a high level of insurance in computerized interchanges against gate crasher assaults similarly as the correspondence between two unique PCs is concerned.

ACKNOWLEDGMENT

It gives us immense pleasure to present this Research Paper. We grab this opportunity to express our heartfelt obligation towards the people without whom completion of this Research Paper have not been possible. We would like to thank our guide Prof. Megha Mudholkar for her immense support and continuous encouragement to our team.

REFERENCES

- [1]. <https://sites.google.com/site/gtublog/sem4/640001/fundamental-cryptographicprinciples>
- [2]. <http://www.garykessler.net/library/crypto.html>
- [3]. Book- Cryptography and Network Security
- [4]. www.cisco.com
- [5]. <https://technet.microsoft.com/en-us/library/cc962027.aspx>
- [6]. www.cs.iit.edu/~cs549/lectures/CNS-1.pdf
- [7]. Bahar Saini, "Implementation of AES using S-BOX rotation", International journal of advanced research in computer science and software engineering, May 2014
- [8]. A.E.Rohiem, F.M.Ahmed and A.M.Mustafa, "FPGA Implementation of reconfigurable parameters AES algorithm", 13th international conference on AEROSPACE SCIENCE AND AVIATION TECHNOLOGY, ASAT-13, May 26-29, 2009.
- [9]. Alan Kaminsky, Michael Kurdziel, Stanislaw Radziszowski, "An overview of cryptanalysis research for the advanced encryption standard", Rochester institute of Technology, NY, Horris corp, RF communication Div., Rochester, NY.
- [10]. Amritpal Singh, Mohit Marwaha, Baljinder Singh, Sandeep Singh, "Comparative study of DES, 3DES, AES and RSA".
- [11]. Ritu Pahal, Vikas Kumar, "Efficient implementation of AES", International journal of advanced research in computer science and software engineering, volume 3, issue 7, July 2013
- [12]. N.Lalitha, P.Manimegalai, V.P.Muthu umar, M.Santha, "Efficient data hiding by using AES and advance Hill cipher algorithm", International journal of research in computer applications and Robotics, volume 2, issue 1, January 2014.
- [13]. Sweta K.Parnar, Prof. K.C.Dave, "A review on various most common symmetric encryption algorithm", International journal for scientific research and development, volume 1, issue 4, 2013.

Biometrics: The Future of Mobile Phones

Guided by: Ms. Sonam Pareek

Yasmin Shaikh

TIMSCDR

Saddam Shaikh

TIMSCDR

Ashu Singh

TIMSCDR

Abstract: Generally we use codes or passwords to authenticate access of mobile device but now with the use of bio metrics which is increasingly being implemented in today's world hence the use of bio metric is a secure way to authenticate access to mobile devices. This research paper provides information about the area of bio metrics. It tells us how to implement this on mobile device and its advantages and disadvantages.

Keywords: *Biometrics, Facial recognition, finger print scanner, mobile devices, authentication, security, verification*

I. INTRODUCTION

Biometrics is believed to be the best way to identify an individual. They use physiological and behavioral characteristics, which are unique to just one person. Implementing biometrics into mobile phones is looking to be the future of mobile security.

More mobile phones are being stolen every day now than ever before due to the growing market which demands the supply. A victim of such theft can either be deprived of their mobile phone or be vulnerable to losing sensitive information.

Mobile phones are become increasingly more evolved, users now use their mobiles to do more day to day tasks than ever before; email, surf the web, online banking. They are now even used as a digital currency that's links to the user's debit of credit card. This means that mobiles now have more sensitive data on that needs to be protected.

The use of biometrics to authenticate a user instead of passwords on mobiles is now being studied as a way to improve security to protect the increased amount of sensitive data. However, like all security methods, there is the risk of vulnerabilities and flaws, which will be looked at addressed later. We will also looked at how the combined use of biometrics can make a phone more secure than individual biometrics.

II. BIOMETRICS

Biometrics is the technique that measures and analyses the human body characteristics either physiological and/or behavioral, such as DNA, Fingerprints and eye retina is often regarded as a new concept, however there are numerous historical events where the use of physical and behavioral characteristics are used to identify individuals. There is proof of this first being

recorded in the construction of the great pyramid of Khufu, workers were required to provide a thumb impression which was recorded in a book, the thumb impression was used to identify the workers for their food allowance. However it was discovered that the workers were creating fake identities, they then added other physical and behavioral characteristics to the record as well. The next big discovery was in 1893 it was made by Sir Francis Galton, that no two fingerprints are alike, even in the case of identical twins. Biometrics has been evolving for centuries but have all the flaws that have been exploited for year's final been fixed to a level where biometrics are safe to use for mobile devices.

III. TECHNIQUES

i. **DNA matching**

This is a relatively new technology, it analyses DNA sequences to identify or authenticate a person. DNA is a one dimensional code sequence that is present in every cell in the human body it defines who a person is physically and intellectually, unless a person has an identical twins, it is not likely any other person will have the same exact DNA. It can be instructed in many ways; blood, hair, saliva.

ii. **Vein Identification**

This is also a relatively new technology, it uses infrared light to scan the back of a person's hand or their finger to read the pattern of the veins to identify or authenticate a person. The technology has the potential of delivering high accuracy and speed once the technology is refined.

iii. **Finger Scan**

This technology uses the unique fingerprint patterns on the human finger to identify or verify the identity of the individual. There are several different methods that can be used; optical scanning, capacitive scanning and ultrasound scanning.

An optical scanner starts when you place your finger on a glass plate; a charge coupled device (CCD) camera takes a picture. The scanner contains its own light source, to illuminate the print and display the ridges of the fingerprint. The CCD creates an

inverted image of the print, where the dark areas represent more reflected light and the light areas representing less reflected light.

The capacitive scanner uses an array of capacitor plates to image the fingerprint. Skin is conductive enough to provide a capacitive coupling with an individual capacitive element on the array. The skin closer to the detector has a higher capacitance and the lower level skin a lower capacitance.

The ultrasound scanner uses high frequency sound waves to penetrate the layers of skin. The reflected wave measurements can then be used to form an image of the fingerprint.

A finger print is defined by the different ridges and valleys on the surface of each person's finger. Ridges are the upper level of skin and the valleys are the lower level of skin. Fingerprints uniqueness comes from the pattern of ridges and valleys.

iv. Facial scan

Facial scanning is a fast growing area in biometrics, with improving technologies facial recognition is now able to convert an image or a video image into code that describes a face's physical description. IT can be used to identify a person from afar without intruding into their personal space. The computer software that is able to do this reads the peaks and valleys in a person's face, these peaks and valleys are known as nodal points. There are 80 nodal points on a person's face; however the computer system only needs 15-20 of these to identify a person. There is an area on the face known as the golden triangle, this is the region between your temple and lips, this area doesn't change even with age, weight gain or hair growth.

This technology uses the unique aspects of a person voice; sound, pattern and rhythm, to identify them. This system can only identify certain phrases spoken by a person, which means it is text-dependent.

v. Iris scan

This technology uses the unique features of the human iris to identify a person. It uses camera technology and subtle IR illumination, which reduces the amount of specular reflection from the convex Cornea to take high resolution imagery which identify patterns in the iris. These images converted into digital templates provide a mathematical representation of the iris which will be individual to every person.

vi. Retina Scan

Retina scan technology uses the distinct features of the retina to identify and authenticate an individual. It is considered one of the least used technologies in the field of biometrics, mostly used by high classified government and military facilities. This technique offers high levels of accuracy, yet it is still very unpopular, this is due to the difficulty of using the technology and in addition the user's

discomfort.

IV. BEHAVIORAL BIOMETRICS

Behavioral Biometrics is based on the pattern of behavior of a person. Behavioral Biometrics includes; Signature scan, Keystroke scan and gait recognition.

i. Signature scan pattern of Behavioral Biometrics: This technology uses a person's signature for verification, this technique is used by delivery companies around the world, and it is non-invasive to the user and flexible in the sense that it can be changed by the user. It is not that most reliable as people's signatures can be inconsistent. Its reliability can be increased though by adding dynamic features such as; velocity, acceleration and pressure.

ii. Retina Scan pattern of Behavioral Biometrics: Retina scanning provides high level of accuracy as the retina is located deep within the eye it is unlikely to be affected by environmental or temporal conditions. It is also resistant to false matching or false positives and it remains stable throughout a person's lifetime.

iii. Signature Scan pattern of Behavioral Biometrics: Due to the large amount of data provided from a signature scan, it is very hard to forge, not the signature itself but the traits and characteristics of the writer. It can also use existing processes and hardware, such as signature capture tablets, as people are used to providing their signature for transactions it is a user friendly method of identification.

iv. Keystroke Scan pattern of Behavioral Biometrics: The main advantage of keystroke scanning is that there is no need to purchase new hardware unlike other biometric methods. It only requires a standard computer keyboard, and then the user just has to type, it is a very user friendly method. It can even be run in the background, over long periods of time.

v. Voice Scan pattern of Behavioral Biometrics: A person's voice is very difficult to forge as such a large amount of qualities in the voice are measured making this a secure method of biometrics. Most systems also match the voice to a text dependent phrase or a randomly generated phrase which would make it difficult to be able to match the generated phrase with a plausible voice recording.

vi. Finger Scan pattern of Behavioral Biometrics: This is a very popular technology, due to a number of reasons. Firstly it's a very mature and proven technology, it has been rigorously tested and delivers highly accurate levels of results, which can be increased if you use more than one finger print for each

individual. It is also a very flexible technology that can be used in a wide range of environments. It also has the advantage of employing “ergonomic, easy to use devices”.

vii. Facial Scan pattern of Behavioral Biometrics:

Facial scanning has many benefits, it can easily be integrated into systems that already use image acquisition equipment and can be used to search against already stored static images such as passport photos. Additionally, it doesn't require the user to be there or their cooperation to obtain the required data.

viii. Keystroke scan pattern of Behavioral Biometrics:

This technology identifies a person's distinct typing pattern to verify them. This can be combined with the standard password for increased security. All the data is gathered from the keyboard so there is not cost for hardware. It is also practically invisible to the user who is typing in their password, and it is also flexible as it allows for the user to change their password. However this is a fairly new method and the underlying method has not yet been fully developed. In addition keystroke scan inherits all the flaws of password-based systems.

V. BIOMETRIC FLAWS

- i. **DNA Matching:** DNA matching raises many concerns over “privacy issues, invasiveness and data misuse”. It also has multiple flaws, DNA can be contaminated or stolen for an ulterior motive. There is no real time application possible as it is such an intricate process requiring complex chemical methods and expert skills. So the process is very costly and time consuming. The privacy issue comes into debate as it is a sample taken from an individual is likely to show susceptibility of a person to some diseases. All this limits the use of DNA matching to forensic applications. Finally if DNA matching is not carried out properly the identification code can be skewed.
- ii. **Signature Scan:** The signature scan is not regarded as the most reliable biometrics due to the user, signatures tend to change over time and are not always consistent. It also requires the purchase of new equipment, a special digitalized tablet, for capturing pen pressure and other attributes.
- iii. **Keystroke Scan:** Keystroke scans are sensitive to changes in keyboards and changes in typing language, they can also be easily affected by the users physical condition; fatigue, illness, hand injury. There aren't many commercial items out there that use keystroke technology so it is not easily assessable. They are also not always aware of typing errors which could affect the way a person types.

VI. MOBILE IMPLEMENTATION

Not all of the biometrics above would be suitable for mobile devices, due to size, cost or expertise. Also some of the biometrics due to flaws would be better implemented alongside one another.

- i. **Voice Scan:** There are two main obstacles for voice scanning; data acquisition and data storage. To be able to collect accurate data the capture device needs to be able to capture quality data and be absent of noise, as this will make the data unreliable. In addition, the data that is needed to compile a voice template is relatively large which seriously limits the applications that can use this technology.
- ii. **Facial scan:** Facial scanning has a few drawbacks, the most obvious being the amount of variables present, such as the surroundings of the individual and changes to the individuals physiological characteristics. Also the fact that the user doesn't need to be in cooperation for the scan to happen raises issues with privacy.
- iii. **Finger Scan:** There are weaknesses for finger scanning that prevent it from being useful in certain applications. It has been discovered that “most devices are unable to enroll some small percentage of users”. This is due to hardware limitations and physiological reasons. Fingerprint scanning has also been known to deteriorate over time due to ageing or wear and tear. It can also be seen as forensic application used by law enforcement.
- iv. **Iris Scan:** Challenges arise with the iris scan as the image acquisition process requires the use of proprietary devices and accurate positioning and the need for specialist training. In addition for some users, using an eye-based technology represents a major discomfort.
- v. **Retina Scan:** Retina scanning has yet to be taken up by the military or government due to its complicated technology, it requires difficult image acquisition. Often the scans can last a long time due to the requirement of multiple images which can cause the user discomfort; it could be seen as intrusive as it requires close contact to the eye.
- vi. **Currently Used:** Two methods of biometrics have already been implemented into new mobile devices. This has started the future of security for mobile devices.
- vii. **Facial Recognition:** Facial recognition has already been implemented into mobile devices as a way of authentication. However Facial recognition on its own is very secure. An experiment showed that illegal authentication success rate of 97% with a captured image and 87% with just a face photo. Based on this experiment it doesn't make facial

recognition very secure, especial with social networking sights that include 100 images of a single individual.

viii. **Fingerprint Scanner:** Fingerprint technology has recently been released in a top end mobile device, using a capacitance scanner. Allowing the user to authenticate themselves to login and pay for apps. Nevertheless no security system is 100% reliable however, most research carried out for hacking a fingerprint scanner did so using a live finger to create mold. This is unlikely to happen in a real life scenario if a mobile phone was to be stolen.

VII. COMPARISON BETWEEN THE COMMONLY USED BIOMETRICS

TABLE 1: COMPARISON BETWEEN COMMONLY USED BIOMETRICS

Biometric Characteristic	Uniqueness	Permanence	Collectability	Performance	Acceptability	Obtention Resistance	Cost Effectiveness
Fingerprint	M	H	M	H	M	M	M
Face	H	M	M	H	M	H	M
Hand-Geometry	M	M	M	H	M	M	M
Iris	H	H	H	M	H	L	L
Retina	H	H	H	L	M	M	M
DNA	H	H	H	L	L	L	M
Signature	L	L	L	M	L	H	M
Vein Patterns	M	H	H	M	M	H	M

(Where H=High, M=Medium, L=Low)

As we mentioned above that each biometric technology has its strengths and limitations. Table 1 gives us a brief comparison between the most commonly used biometric techniques.

VIII. FUTURE DEVELOPMENT

Now biometrics have started to emerge on the mobile phone market, the next step will be looking into other possibilities to increase security, this could be through combining two techniques or looking into other biometrics methods.

At the moments vein identification, is too large for it to be implemented into mobile devices, they have managed to make it compact enough for pc access, but it will need to reduce in size even more before it can penetrate the mobile market.

Keystroke scan could easily be implemented onto mobiles that have a keypad, this could be used alongside another biometrics to make it more secure. It could be constantly run in the background to allow the system to collect as much data as possible to identify an individual.

Many of the other biometrics either require expertise or are not user –friendly. The next step for biometrics in mobiles will be looking at combining more than one method.

IX. CONCLUSION

Biometrics should be implemented as a standard across mobile devices to improve prevention against theft.

Now that mobile phones contain so much sensitive information and the increased theft, they need a system other than PIN or password as the only form of verification. As you can see from the research above biometrics is a good way to authenticate an individual, increasing its reliability by combining methods. There is one negative to using behavioral and physiological traits if the system that was containing this information was stolen there is no way for the user to change it, this could lead to identity theft.

As you have seen throughout this research all of the biometrics have flaws, there needs to be a failsafe. This could be a key/lock system where the phone requires the charger. This incorporated with biometrics could make a very secure system and deter theft.

REFERENCES

- [1] Barghouthi, H. Keystroke Dynamics.
- [2] Avdeling. *Department of Computer Science and Media Technology*, (Gjøvik University College,2009)
- [3] Baird, S. Biometrics. *Technology Teacher*, 61(5), 18-22.

Character Animation from 2D Pictures and 3D Motion Data

Guided by: Ms. Sudeshna Sen

Seema Choudhary

TIMSCDR

Chinmay Chavan

TIMSCDR

Chandrabhushan Dubey

TIMSCDR

Abstract: This paper represents a new way to animate images of 2D characters using 3D motion capture data, given an image of a person or essentially human-like subject, this method transfers the motion of a 3D skeleton into the subject's 2D shape in the image space, generating the impression of a realistic-like movement. We'll present robust solutions to reconstruct a projective camera model & a 3D model pose what'll match best to the given 2D image. Relying on the reconstructed view, 2D shape template is selected what'll enable the proper handling of occlusions. After we fit the template to the character in input image, it is deformed as rigid as possible by taking the projected 3D motion data into picture. Our method thereby correctly handles projective shape distortion. It'll work for images from arbitrary views and requires only a small amount of user interaction. We'll present animations of a diverse set of human characters with different types of motions such as walking, dancing or jumping.

Keywords: 2D, 3D .animation, pose

I. INTRODUCTION

In the recent years, research on the 2D image manipulation has received a huge amount of interest globally. Very powerful solutions for the problems such as matting, image completion, texture synthesis and rigid image manipulation have been presented. So based on these and similar methods, it has now become very possible to explore interesting new ideas to reanimate still pictures, for e.g., as done by Chuang et al. [2005] in their article on animating the pictures using stochastic motion textures. They animate passive elements, such as trees and water that are subject to natural forces like winds. In this paper, we want to take the idea of creating animations directly in the image space one step further by making photographed people move. One possible approach to address this problem would be reconstruction of a textured 3D model & to animate this model using classical animations techniques. However, would require complex, fully textured 3D model which have to be created and adapted per image. Particularly, for highly detailed characters such as the Scarecrow the required manual model-adaption process would be impractical. It would be necessary to apply very sophisticated 3D rendering

techniques to realistically embed the 3D model into 2D image so as to preserve photorealism or style of the original input images. Even simple 2D morphing and blending often leads to more convincing results than using sophisticated 3D reconstruction and rendering. For example, methods such as Poisson-matting or 2D image completion allow for smooth and realistic combination of different image contents, which is much harder to achieve when trying to augment the 2D images with 3D models. Hence we present a purely image-based approach for combining realistic images with realistic 3D motion data in order to generate visually convincing animations of 2D characters. This is motivated by intention to preserve the realism or style of original image data without losing quality due to intermediate conversion steps into a 3D representation. The contribution of this paper is a method to generate animations of photographed or painted 2D characters which are based on 3D motion data. For arbitrary input images, our method robustly reconstructs the camera and 3D model pose corresponding to depicted subject. Using generic shape templates, character is decomposed into animation layers. Occluded regions and background are reconstructed by texture synthesis. We'll show how resulting character-shape can be animated using an augmented version of the as-rigid-as-possible shape manipulation technique, which correctly handles the projective distortion effects such as foreshortening. In combination, these techniques will enable us to realistically change the pose of the character or create animations from single input images of arbitrary human and nonhuman subjects based on 3D motion data.

II. RELATED WORK

This work is inspired by a diverse set of interesting methods for augmenting and animating 2D images. While manipulating images, inevitable prerequisites are tools to generate proper segmentations or alpha mattes [Sun et al. 2004] and the completion of missing image information. These techniques have paved us the way for different kinds of image manipulation approaches. The warping technique to augment cell animations with

texture is complete image-based modeling and editing system, which contains, among other things, custom-tailored algorithms to reconstruct approximate camera positions for different types of images. The motion and style of cartoons and retargeted this onto 3D models and 2D images. Algorithms for manually deforming objects in 2D space by affine, warping or curve-based editing. Thorne et al. [2004] implemented a curve-based system which allows the user to animate characters by drawing motion lines. Video sequences into different motion layers and showed how the subtle motion of these layers could be emphasized. The method to animate passive objects in a picture such as water or trees for instance,, which are subject to stochastically modeled natural forces. An object-space morphing technique as rigid as possible shape interpolation was first introduced by Alexa et al. [2000]. Igarashi et al. [2005] reformulated this problem and presented an interactive method for rigid shape deformation in 2D. They simulate as-rigid-as-possible 2D shapes which can be arbitrarily deformed by the user in real time. This is achieved by imposing shape-preserving energy functional on the interior of the shape. Our work is based on this method and extends it to the context of deforming multilayered shapes with perspective correction in order to simulate 3D deformations.

III. OVERVIEW

In this section we described the prerequisites of our method and provided a high-level description of the algorithm. As mentioned in the introduction, the central idea of our method is to deform the 2D shape of an arbitrary character directly in image space using 3D motion data. 3D motion data consists of a sequence of poses of predefined human skeleton model. Each pose contains respective positions and orientations of the skeleton bones and joints in 3D space. The first step maps 3D data to the 2D image by reconstructing a proper camera model and a model pose that best fits the 2D character in the image. We achieved this by letting the user manually specify correspondences between 3D and 2D, simply by selecting the joint positions in the 2D image that corresponds to the joints of the given 3D human model. Based on these 3D to 2D correspondences, we automatically computed a camera projection matrix and a best-matching pose from the 3D motion data repository, which provides the closest possible fit to the user-selected pose in 2D. This model pose and camera determination step is described in Section 5. Next phase prepares the subsequent animation by an initial model fitting of a generalized shape template to the user-selected pose of character. Each template comprises of a set of layers corresponding to different parts of the character’s body

& combined into a single non-manifold triangular mesh. To account for occlusion, textures & alpha mattes are pulled off an input image for each layer, using Poisson-matting. The missing parts of the background are synthesized by standard image completion (Section 6). Final animation (Section 7) is rendered in real time using the projected 3D joint positions from different poses in motion sequence to control deformation of the 2D shape in image space. We demonstrate that the original As Rigid as Possible (ARAP) shape manipulation is not sufficient for creating proper character animations, since it does not account for projective distortions, such as foreshortening, which naturally occur when projecting 3D motion data. Therefore we propose an augmentation called as-similar-as-possible (ASAP) shape deformation, which properly takes these perspective effects into account. This overall approach allows us to transfer inherently realistic 3D motion-captured data to 2D shapes of arbitrary human-like characters, while preserving the photorealism of the original image. The following sections explain each of these steps in detail.

IV. JOINT SELECTION

To establish necessary correspondences between the subject’s 2D shape and the 3D skeleton model, we let the user select joint positions in the input image manually. This is done by a simple interface, where the user can move the joints of a stylized skeleton having a structure compatible to our 3D data. We preferred a manual user interaction over automatic procedures because this step generally takes only a few minutes to complete, and leads to superior results in poses which are confusing for automatic human-pose estimators or which are difficult to estimate due to occlusions. Furthermore, such methods would require a diverse dataset of example poses to work for arbitrary images.

V. CAMERA AND MODEL POSE DETERMINATION

Since we wanted to use 3D motion data to animate the 2D shape, we have to compute a camera projection model P which describes the mapping from 3D joint positions of the skeleton to 2D image space. Furthermore, we need to find an optimal 3D pose X_0 in our motion sequence that is closest to the manually selected 2D pose, so that we have a reasonable starting solution for the subsequent animation. For the computation of the projection P , suppose we have a 3D pose given by a vector of joint positions $X = (..., X_{T_i}, ...)$ T which exactly correspond to the user-selected 2D joints x_i . The unknown camera projection P can then be estimated from these world-to image

correspondences. A variety of linear and nonlinear algorithms exist for this problem, which estimate P by minimizing, for example, the reprojection error from 3D to 2D: $\sum_j \|P_j X_i - x_{i,j}\|^2$, with $j \in \{1, 2\}$ referring to the j th row of P and x_i , respectively. However, since these methods often do not impose any constraints on P, the resulting projection generally does not correspond to a geometrically plausible Euclidean camera model. While such an unconstrained projective camera provides an optimal fit for the corresponding pose X, it might lead to very unnatural deformations of the projected 3D model during the actual animation with different poses. Instead, we would like to compute a parameterized camera projection $P = KR[Id | -C]$ consisting of an intrinsic calibration K, an extrinsic right handed orientation R, and a world-space camera center C. To impose the nonlinear orthonormality constraints on the extrinsic orientation, R has to be parameterized, for example, using Euler angles or quaternions. This yields a projection matrix consisting of 11 unknowns

$$P = \begin{pmatrix} \delta_x & s & p_x \\ \delta_y & p_y \\ & & 1 \end{pmatrix} R(\alpha, \beta, \gamma) \left[\text{Id} \mid - \begin{pmatrix} c_x \\ c_y \\ c_z \end{pmatrix} \right].$$

At the point when registering a camera projection grid utilizing the former parameterization, an outstanding issue, be that as it may, is the way that an unconstrained improvement of the inherent adjustment K still prompts to undesired mutilation impacts amid liveliness. The purposes behind this are that we generally have to compute an initial (unconstrained) straight beginning arrangement of P, and that it is hazy how to force any important imperatives on K amid the ensuing nonlinear streamlining. This issue is muddled by the way that the user selected joint positions are by and large generally mistaken, and because we are not guaranteed to have a perfectly matching pose in our 3D database in the first put. Consequently, we need to compel the optimization process to robustly converge to area so noble estimate of P, despite the mismatch between the user input and the 3D motion data. We found that, with regards to this work, an exceptionally stable technique to appraise a camera P with the sought properties can be accomplished by fixing the components of K, aside from the central length amid the optimization, and by providing a proper starting solution forth external information, rather than an unconstrained direct arrangement. Sensible presumptions for the inborn information of most cameras are a zero-skew factors, the principal point (p_x, p_y) at the image center and scaling variables δ_x and δ_y in light of the picture determination, a unit angle proportion, and a run of the

mill field-of-view (e.g., like an OpenGL projection framework). Henceforth we set:

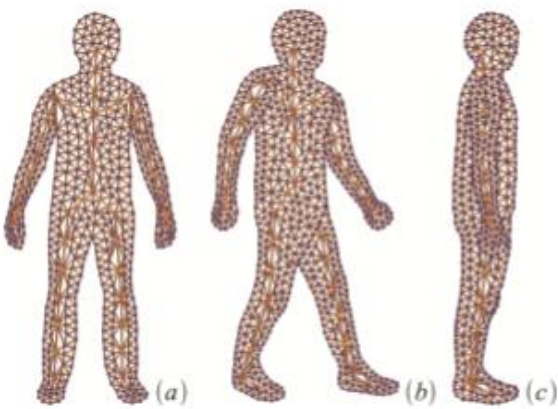
$$s = 0, \quad p_x = \frac{\text{width} - 1}{2}, \quad p_y = \frac{\text{height} - 1}{2}, \quad \delta_x = -\delta_y, \\ = \Delta f \frac{\text{width}}{2 \tan(\phi/2)}, \quad \text{with } \phi = \pi/8 \text{ and } \Delta f = 1.$$

The factor delta f allows us to adjust the pre defined field -of -view ϕ amid the nonlinear streamlining process. The outward information is essentially introduced with $R = Id$ and a camera focus at safe separation from the foundation of the 3D skeleton show, for instance, a various of the bouncing box slanting d of the model:

$$\alpha = \beta = \gamma = 0, \quad C = (0, 0, 5d)^T.$$

To figure an upgraded projection grid $P(f, \alpha, \beta, \gamma, C)$ in view of the staying seven free parameters, we utilize an iterative Levenberg-Marquardt solver to minimize the reprojection error $\sum_i \|P_j X_i - x_{i,j}\|^2$ with the previously mentioned beginning arrangement. Since this underlying arrangement relates to a geometrically conceivable camera show, and since the enhancement procedure additionally works exclusively on the previous parameterization of P, the subsequent camera is ensured to protect all wanted inherent and outward constraints. In all our experiments, this approach converged robustly to the desired optimum, without the necessity for any parameter adjustments. Besides, it appeared to be obtuse to parameter changes, that is, ϕ or C. To find the ideal 3D posture X_0 for the ebb and flow client choice, we couple the camera and model stance estimation into a solitary streamlining issue with eight degrees of opportunity by just running the prior calculation over all stances contained in the movement information arrangement, and set the stance bringing about the insignificant reprojection blunder as X_0 . In contrast to other pose estimation techniques, we can radically lessen the scan area for substantial stances to one level of flexibility, since we just need to find the best arrangement in our current grouping of stances for the ensuing activity stage. For a typical 3D motion sequence of about 300–500 animated poses, the improvement strategy takes short of what one moment to figure. We need to stress that this calculation does not take care of the general camera alignment issue, but rather gives a specific arrangement going for reproducing a surmised, yet "conceivable," camera demonstrate for a given picture with client chose 2D joints and a predefined 3D skeleton display, which is strong as for errors between client chose joints and the 3D information. Our calculation may neglect to join to a legitimate arrangement in situations where the client

defined posture is excessively not the same as any stance inside the chose 3D movement information succession. In such cases, the client has the alternative to deactivate display joints and to pick a specific, fixed field-of-view (which then influences the measure of foreshortening amid movement). Now and again, such a client controlled field-of view can even be of favorable position to underscore point of view impacts. Then again, our technique demonstrated to work powerfully even on creature shapes that are entirely not quite the same as a human shape. At the end of this step we have computed the most likely camera projection network P and the best-coordinating 3D posture X_o which most closely approximates the user-selected joint positions. Based on this information, we instate our calculation for 2D shape liveliness.



Set of here shape templates generated by cycling in 45 degree steps around a man; (a) frontal view with one liveliness layer; (b) and (c) half profile see and a side view with four layers each: first arm, body and front leg, and one for the leg and the arm at the back, separately.

VI. INITIAL MODEL-FITTING

To make persuading activities regarding a 2D character, we might want to misshape its shape conceivably, while keeping the exertion for creating liveliness on a negligible level. Our essential thought is to utilize an arrangement of bland shape layouts T , which speaks to the topological changes of a summed up character, demonstrate for various view points of the camera. These templates are fitted in a semi-automatic approach to the character. In our context, we define a shape template as a 2 Domain fold triangle mesh which allows for there presentation of different animation layers. For example, when animating characters from aside view, we have to consider different layers for separately moving parts of a body, for example, one layer for the preeminent arm, one for the body and the premier leg, and one for the rest of the arm and leg, separately.

Additionally, these layers can't move autonomously, however must be "sewed" together to pass on the impression of an associated body when enlivened. Henceforth, every layer of a format T comprises of a triangulated set of vertices speaking to the shape limit and skeleton joints. The diverse layers of every layout are associated by shared limit vertices. Extra vertices are included inside every layer, which permits us to create more reasonable activities by "inflating" the shape layouts preceding movement. This reality, be that as it may, is not vital for the examination of our underlying model fitting venture in this segment and will be clarified in Section 7. For given image, a shape template can be automatically selected by misusing the recreated extraneous camera information R and C in connection to the best-coordinating model stance X_o . In the accompanying, we will explain how this generic shape can be fitted to the user-chose pose and employed to resolve occlusions for reconstructing a proper surface and alpha matte for every format layer. For the deformation of T , we use an-unbending as-possible (ARAP) shape control method, like Igarashi et al. [2005], which from one viewpoint takes into consideration flexible misshappenings of the character's shape, and on alternate, protects the size and perspective proportions of the character's body to bound the contortion. The ARAP calculation changes a shape layout T in to a deformed shape D , while satisfying ASE to vertex position imperatives. To guarantee an as-unbending as could reasonably be expected disfigurement, the calculation comprises of three stages which go for safeguarding the state of the first triangle confronts $f \in T$. In a first step, a halfway shape I is processed for the given vertex imperatives utilizing, for instance, a Laplace-based disfigurement. Since this progression does not keep a self-assertive scaling of the triangles $f \in T$, a moment scale adjustment step inflexibly fits every face f in a minimum squares sense to the relating face fit as a fiddle, utilizing interpretation and turn as it were. These outcomes in a detached set F of triangles. This set is then changed over into the final twisted shape D by computing the average of corresponding vertex positions in F . Since all computations for the intermediate and fitted, as well as the final twisted shape, are either done on a for every vertex or per triangle basis, this algorithm is fully compatible with our non-manifold shape layouts T . A disfigured shape D can now effectively be created by indicating upgraded positions for internal joint vertices of T . To guarantee that the appendages of a character are really inflexible amid distortion, and that the shape is essentially confined to triangles situated at joints, we put extra requirement vertices along every skeleton bone, and refine the format triangulation in like manner.

The rest of the means to produce a final shape utilized for liveliness then continue as takes after. The shape layout for a given picture is first fitted to the client chose joint positions utilizing a solitary ARAP twisting stride $T \rightarrow I \rightarrow F \rightarrow D$. Contingent upon the jumble between the form of the layout and the character in the info picture, the limits of D are "snapped" to the character's outline utilizing a 2D-snakes approach. Those parts of the outline which don't contain enough data for a steady union, for example, impeded locales of the body, can be physically enhanced by the client. This refined shape is defined as the final adjusted shape T . To create surfaces for every activity layer, we deteriorate T by a front-to-back depth-peeling algorithm. For each of the layers, including the background, we complete occluded texture regions using an interactive method for image completion. Poisson-tangling is utilized to remove an alpha matte for every layer. The underlying model-fitting is finished up by applying a final ARAP control step $T \rightarrow I \rightarrow F \rightarrow To$, changing the character's picture posture, as defined by the client chose joints, into the best-coordinating 3D posture by utilizing the anticipated joint positions $PXi, Xi \in Xo$ as vertex imperatives. The subsequent shape yields the underlying beginning shape utilized for the resulting activity.

VII. ANIMATION

Using the ARAP technique of Igara shietal [2005], we could easily vivify the finished shape layout. By compelling the bone vertices with 2D positions acquired by consecutively anticipating, the stances Xt from the movement data set into the picture plane. Notwithstanding, since ARAP is going for the inflexible safeguarding of the first 2D triangle shapes, this will not lead to plausible formations because point of view scaling and mutilation impacts are totally disregarded. This prompts to unlikely contortions, for example, diminishing or thickening of the character's appendages when they are changing their introduction in respect to the picture plane. Our solution is to generalize the ARAP technique to conceivable procedure. Here, despite everything we play out a succession of twisting strides $To \rightarrow I \rightarrow F \rightarrow D$ for each liveliness frame and pose Xt , but instead of rigidly fitting the original triangles $f \in To$ to the middle of the road shape I to acquire F , we appraise their point of view mutilation, and fit the bended triangles f to I . By this procedure, we in the long run produce a disfigured shape D whose appearances are conceivable to the perceptively contorted triangles f . To gauge the point of view bending of a triangle $f \in To$, we exploit the 3D information given by the motion data. With each bone $b = Xi - Xj$ defined by two neighboring joints in a stance

X , we associate a local coordinate frame L , which changes according to the bone's development.

This change of the bone's introduction gives the essential data to figure the triangle's point of view bending. Give bo a chance to be a bone's introduction in the underlying stance Xo . Its nearby casing Lo is defined by three vectors: $lx = (C - Xi, o) \times bo$, $ly = bo$, and $lz = lx \times ly$, with C being the camera focus (see Section 5). In like manner, we define the neighborhood outline Lt for an indistinguishable bone from it is arranged in the objective stance Xt . We first consider the triangles in To which are uniquely associated with a solitary bone. The 2D vertices v of such a triangle are unprotected to 3D by mapping them to a point Vo on the plane spread over by the vectors, lx and ly , of bo 's nearby edge Lo . Keeping in mind the end goal to stay away from a cardboard impact in the photograph movement at brushing seeing points, we "inflate" the shape formats by including



When animating 2 D shapes with 3D motion data, the original ARAP shape manipulation leads to unnatural results, since it cannot handle size changes and other viewpoint mutilation impacts. The left a portion of this figure demonstrates the first Skater show, and an expanded form after a couple liveliness casings of forward movement without ARAP and with ASAP, our point of view triangle redress step. The ARAP approach tries to safeguard the extent of the first triangles, prompting to significant diminishing of the general character. Our ASAP approach determines this issue by recomposing adjusted triangles. The right-hand-side envisions the distinction of utilizing basic planar shape formats versus inflated layouts. At the point when seating the initially standing Engels statue, the arms stop on the legs at a brushing seeing edge as for the viewer. With flat shape layouts, this prompts to a detectable "cardboard" impact. Conversely, our inflated shape layouts prompt to a more characteristic twisting. As a final note, we need to say that new liveliness can be produced inconsequentially by essentially trading the 3D movement. All beforehand processed strides, for example, the limit snapping and surface era, don't need to be recomputed. Since the camera and model stance can be registered on-the-fly, applying an alternate movement to a character is by and large a matter of seconds.

VIII. CONCLUSION

In this article, we displayed an entire, simple to-utilize framework for enlivening 2D pictures of subjective characters with 3D movement. We demonstrated how basic client cooperation, to be specific the determination of two or three 2D joint positions, can be misused to consequently remake a geometrically conceivable camera adjustment and model stance from 3D movement information. We exhibited an underlying model-fitting step utilizing a non-specific arrangement of shape formats to invigorate discretionary human characters. At long last, we presented an as-comparative as could be expected under the circumstances shape twisting calculation to twist these shapes in a protectively more right way, permitting us to produce still edges and movements of an expansive assortment of characters from various sorts of 3D movement. We trust (this is likewise said in past work around there) that techniques working exclusively on a solitary picture have certain normal limitations with reference to what sort of modifications, or even liveliness, can be accomplished. One limitation of our procedure is the way that it clearly does not work for movements where the character alters its moving course, or where it turns its head, for instance. This would suggest on-the-fly exchanging of the shape layout, and even more importantly, resynthesizing occluded textures would be much more difficult. Nevertheless, in many application scenarios, there is just one single image available, hence, we have to do our best based on this confined data. We believe that our technique gives a good basis for future work, since it identifies the involved

Problems and presents a first finish and flexible answer for this issue area. In mix with different strategies said in our related work area, these techniques could in the long run be coordinated into a powerful toolkit for computer animation from single pictures. Other than the previously mentioned limitations, there is a significant number of focuses which we might want to examine in our future work. Strategies for programmed posture estimation would decrease the measure of client communication in situations where the 2D character is in a generally common pose, such as standing or walking. Furthermore, we would jump at the chance to create smooth moves from the client chose stance to the best-coordinating stance of the 3D movement, or take into account moves between various 3D movements. It would likewise be exceptionally fascinating to incorporate worldwide impacts, for example, shadows or reflections to enhance the visual appearance of a few scenes. At long last, a bigger arrangement of 3D movements would permit us to quicken creatures, or even plants. These issues give an intriguing premise to future research.

REFERENCES

- [1] Recovering 3D human pose from monocular images - AGARWAL A. AND TRIGGS B. 2006
- [2] Pose space deformation: A unified approach to shape interpolation and skeleton-driven deformation – LEWIS J, CORDNER M, and FONG N. 2000.
- [3] 3D character model creation from cel animation. In IEEE Cyber worlds -ONO, Y., CHEN, B.-Y., AND NISHITA, T. 2004.
- [4] Motion doodles: An interface for sketching character motion – THORNEMBURKE,D.,AND VANDEPANNE M. 2004.

Evolution of Cyber Crimes

Guided by: Ms. Reshmy Rakesh

Namrata Khorjuwekar

TIMSCDR

Deepesh Lad

TIMSCDR

Amit Kushwaha

TIMSCDR

Abstract: Cyber Crime is a crime that involves a network and a computer. The Computer may have been used in the undertaking of crime, or it may be the target. Cyber Crime began as an attempt at gaining bragging rights and disrepute through high-profile viruses, hacking and website attacks, but today's threats are targeted, discrete, and all about making money. Cyber Crime has come a long way in a relatively short period of time, and will no doubt continue to evolve.

Keywords: *Evolution, Cyber Crime, Computers, e-mail, virus, Hacking, Phishing.*

I. INTRODUCTION

Until the arrival of the Internet, cyber was used in the formation of words relating to computer networks, or virtual reality. The term "Cybernetics" was first coined by the scientist Norbert Wiener in 1948. Cybernetics refers to the study of electronic and mechanical systems designed to replace humans. It comes from the Greek term "kybernetike", which means to lead or govern.

Cyber Crime may be defined as a crime in which a computer is used as a tool/mode to commit an offense (hate crimes, child pornography), or the object of the crime (hacking, phishing, spamming). Criminals may use computer technology to access personal information; use the Internet for malicious purposes, or for business trade secrets.

Cyber Crime, it could also include offenses other than monetary, such as making and distributing small or large programs that are written by programmers (also called viruses) on other computers or leaking confidential business information on the Internet. Another most important form of Cyber Crime is identity theft, in which cyber criminals uses the Internet to steal personal data/information from other users. Various types of social networking sites (Facebook, Twitter, etc.) are used for stealing personal information to find the identity of interested peoples. There are two ways in which this is done – Harming and Phishing; both methods tempt users to fake websites, where in they are asked to enter their personal information's. This includes usernames and passwords, phone numbers, addresses, credit/debit card details, bank account numbers and various other information which criminals can use to steal another person's identity.

In the current scenario, if any people having a computer and the internet connection means it is fully open system for hackers and they can hack into any system and perform illegal activities and hence we require Cyber Laws for executing all transactions in a smooth

way. There is no certain definition for Cyber Law. However, simply put, Cyber Law is the area of law which deals with the Internet's relationship to technological elements, including, computers, hardware, software, and Information Systems (IS).

Cyber Laws reduces large scale damage from cyber criminal activities by protecting information access, communications, freedom of speech, privacy, and intellectual property related to the use of the Internet, websites, e-mail, cell phones, computers, hardware and software, such as data storage devices. The increase in Internet traffic has led to a greater proportion of legal issues worldwide. Since Cyber Laws vary by jurisdiction and country, enforcement is challenging, and remuneration ranges from fines to imprisonment.

II. THE EVOLUTION OF CYBER CRIME

Fifteen years ago the biggest criminals were bank robbers, white-collar crooks, and gangsters, but not anymore. Now the most successful criminals are Cyber Criminals, who steal your money and information from their own homes, potentially making millions of dollars, with little or no chance of being caught.

i. **Spamming:**

Beginning 21st century, as Internet developed, e-mail proved to be a crucial application. As users embraced e-mail, and so did the Spammer. Spammers made millions of dollars by promoting products of a suspicious nature through unsolicited e-mail. As anti-spam systems blacklisted the servers, the Spammers found out that they needed large numbers of new computers to continue to deliver spam e-mails to inboxes.

ii. **Denial of Service Attacks:**

Innovative and creative minds identified new criminal business opportunities that could be provided by bots. If many computers access a website at once, the sharp increase in demand consumes the website's resources, providing it unable to serve web pages. This denial of service (DoS) attacks could bring down a website for a day or more at a time, causing financial harm to the dot-com industry. One such incident that involved DoS attack was in the year 2010 where the victims (MasterCard and Visa) were attacked by WikiLeaks supporters for freezing their customers' donations to WikiLeaks.

iii. **Anonymous Markets:**

As legitimate web services grew and developed, and so did criminal services. Criminals found out that credentials and personal information can be harvested from malware-infected computers. Criminal experts knew how to monetize this stolen information but they didn't necessarily have the specialized skills to write and distribute the malware needed to collect the data/information. This led to the development of underground or black markets where individuals who could infect computers and/or collect stolen information could sell their services to those who could capitalize/monetize on the stolen data. As criminals profited from data stolen by malware, nation states began to invest in the development of spying by malware and the era of the Advanced Persistent Threat was born.

iv. **Crime-as-a-service:**

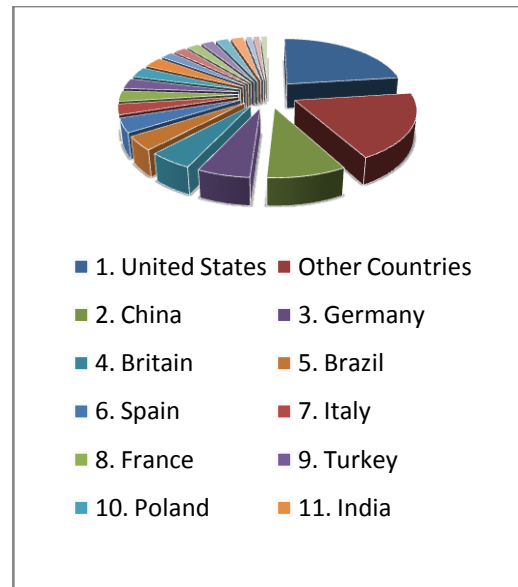
As the technology is evolving, cyber criminals are able to make money in various new ways, hide their tracks and remain hidden. The Internet Organized Crime Threat Assessment highlights that this service-based criminal industry is developing to the point where the growing number of those operating in the underground are starting to make services and products for use by other cyber criminals. The diffusion of this business model allows cyber criminals without considerable technical expertise to operate.

v. **Attacks on Minors:**

Child pornography is expected to remain steady in terms of physical concurrent acts. This form of crime relies on "human material", with children victimised by acts of paedophilia or made to participate in carrying out offenses. This is still risky for criminals due to legal enforcement. Child pornographers often argue that they are not doing anything wrong, instead believing themselves to be merely "voyeurs".

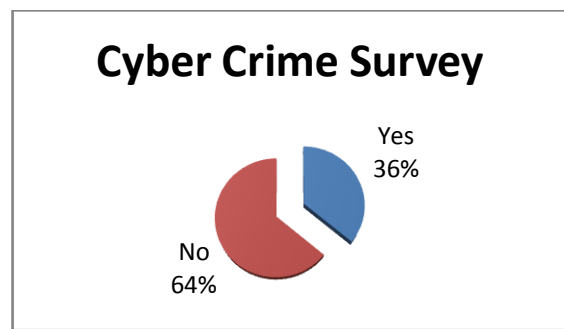
III. **CYBER CRIME – TOP 20 COUNTRIES**

These are the list of 20 Countries that leads in Cyber Crimes according to a software company.

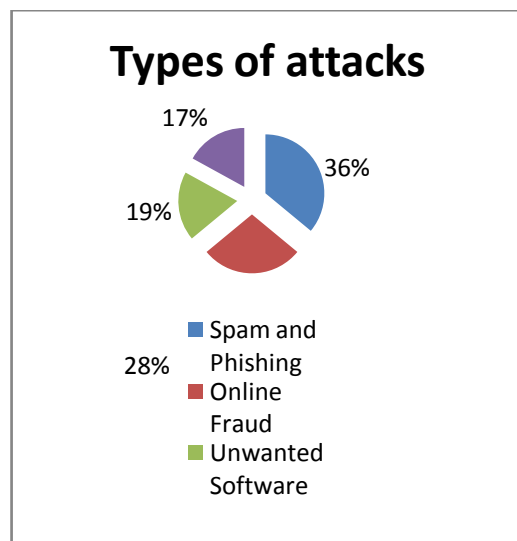


IV. **SURVEY**

We took a survey of 100 people and we got the following results:



Out of 100 people we surveyed, we found out 36 people were the victims of cyber crimes.



Those who were victims of cyber crimes, 36% were the victims of Spam and Phishing which is done through emails or social media.

V. ACTION THAT HAS TO BE TAKEN BY COMPANIES

The most important step is to educate people on how to protect their privacy from being invaded by cyber criminals. The employees also need to be trained on how to protect their work. In modern technology era, it is necessary to regulate cyber crimes. Cyber Law also should be made stricter in case of spammers and hackers.

VI. MAJOR DETERRENTS FOR THE COMPANIES AND THE POLICE

Companies don't want to get into trouble and does not want to be publicized for wrong reasons and they try to sort it out through their own security system. Police are also concerned as they are reluctant to take cyber crime cases, as the investigation is very expensive.

VII. MEASURES TO AVOID CYBER CRIMES

- Take the help of Cyber Forensics to detect Cyber Evidences.
- To make necessary amendments in laws to control criminal activities online.
- Avoid sending photographs to strangers and chat friends online, as there have been incidents of photograph misusing.
- Use up to date and update the anti-virus software to guard against all the possible virus attacks.
- Keep the back up of your data, so that one may not suffer data loss in case of virus attacks.
- Never send credit/debit card number to any website that is not secured, to avoid online frauds.
- Always use a better security programme that sends data/information back to sites and also give control over the cookies as it might prove fatal if cookies are left unguarded.
- Web-Site owners should check traffic and any irregularity on their site.
- The best way to prevent malware, is by avoiding clicking on links or downloadable files from unknown senders.
- Always check whether your computer's Operating System uses the most up-to-date security updates.
- Verify requests from institution that arrive through e-mails.
- Most of the companies are determined that they never ask for personal information through e-mails.
- Using strong password is the only way to protect against password attacks.
- Always use HTTPS connection while connecting to a website for better security.
- Always download and install an anti-virus software which can detect threats like Rogue software.
- Never use unprotected PC's for online banking.
- Register for SMS or Email Alerts for transactions.
- If you lose your phone, deactivate all banking related services linked to that number.

VIII. CONCLUSION

Changes are happening drastically and with that changes the technology is getting more advanced daily and criminals are pursuing new methods and have started relying and using advanced technologies and in order to deal with them, the law enforcement authorities and organizations also need to change. Such experts should be knowledgeable and also should be provided with the necessary software and hardware, to fight against the cyber criminals. It is very likely that criminals and hackers will continue to evolve. Hacking and computer crime, they both will remain with us as long as Internet is there. Cyber space offers a huge amount of opportunities for criminals either to earn fast money by targeting unknown people, or by causing harm to innocent people. We all have to be alert and avoid from being fooled by cyber criminals. There will always be new challenges to stay ahead of cyber criminals and it can be done only when individuals and government collaborate.

REFERENCES

- [1] <https://www.alertlogic.com/blog/the-evolution-of-cyber-crime/>
- [2] <https://www.techopedia.com/definition/2387/cybercrime>
- [3] https://home.mcafee.com/advicecenter/?id=rs_na_sp11article1
- [4] <http://quickbooks.intuit.com/r/technology-and-security/8-types-of-cyber-attacks-your-business-needs-to-avoid/>
- [5] Reference for the details of Top 20 Countries: <http://www.enigmasoftware.com/top-20-countries-the-most-cybercrime/>
- [6] Survey taken through Swurveys <https://www.swurveys.com/>

BUFFER MANAGEMENT IN DISTRIBUTED DATABASE SYSTEMS: A DATA MINING-BASED APPROACH

Guided by: Ms. Sonu Gupta

Abhishek Singh
TIMSCDR

Anurag Singh
TIMSCDR

Karan Singh
TIMSCDR

Abstract: In this paper, we propose an information mining-based way to deal with open buffer administration in circulated database frameworks where database buffers are composed into two ranges: open and private. While the private buffer zones contain pages to be upgraded by specific clients, people in general buffer zone contains pages shared among clients from different locales. Different from conventional buffer administration methodologies where constrained information of client get to examples is utilized, the proposed approach discovers learning from page get to groupings of client exchanges and uses it to guide open buffer position and substitution. The information to be found and the disclosure calculations are talked about. The effectiveness of the proposed approach was researched through a recreation contemplate. The outcomes show that with the assistance of the found learning, the open buffer hit proportion can be enhanced significantly.

Keywords:- Buffer manager, Domain Separation

I. INTRODUCTION

Because of the higher cost of bringing information from plate than from RAM, generally database administration frameworks (DBMSs) utilize a principle memory territory as a buffer to diminish plate gets to. In a dispersed database framework, database is spread among a few destinations over a PC arrange. With a specific end goal to bolster simultaneousness control and in addition lessen the plate I/O time, an approach of utilizing two levels of buffer in conveyed frameworks has been proposed. The fundamental thought is to have two levels of buffers: an open buffer range to oblige information pages shared among a number of clients and an arrangement of private buffers for individual clients from different locales. With two levels of buffers, the private buffer is sought rest when a client presents asks for a page. On the off chance that no such page exists, general society buffer is then sought and on the off chance that hit, the required page is replicated from people in general buffer into the relating private

buffer for utilize, generally, the page is perused from circle .

II. FEATURES OF BUFFER MANAGER

- A Buffer Manager is non-uniform memory access (NUMA). Buffer Manager Cache pages are distributed across hardware NUMA nodes. It allows the thread to access a buffer page that is allocated on local NUMA node rather than from foreign memory. [2]
- The buffer manager supports Hot Add Memory that allows users to add physical memory without restarting the server.
- The buffer manager supports dynamic memory allocation on the Microsoft Windows 2003 32-bit and Windows XP 32-bit platforms when AWE (Address Windowing Extensions) enabled.
- Dynamic memory allocation allow Database Engine to efficiently acquire and release the memory in the buffer cache to support the current workload
- The buffer manager supports large pages on 64-bit operating system platforms. The size of page is specific to the version of Windows.
- The buffer manager provides additional diagnostics, which are exposed through dynamic management views. These views used to monitor a variety of the operating system resources that are specific to SQL Server.

III. BUFFER MANAGEMENT ISSUES

Public buffer placement problem: When a page which is not in the public buffer is read from disk into a private buffer, should the page be placed in the public buffer as well? Intuitively, pages that will not or seldom be referenced by other users afterwards should not enter the public buffer.

Public buffer replacement problem: When a public buffer frame is needed to bring in a page from disk, and all current buffer frames are in use, which page from the public buffer should be replaced?

Private buffer replacement problem: When a private buffer frame is needed to bring in a page from the public buffer or disk, and all current buffer frames are in use, which page from this private buffer should be replaced? [3]

Among the above three issues, buffer replacement problem has been extensively studied. The most well-known and basic buffer substitution procedure is LRU, the Least Recently Used: When a new buffer casing is required, the page in the buffer that has not been gotten to for a very long time is supplanted. LFU (Least Frequently Used) strategy is another straightforward yet effective buffer substitution arrangement in light of the recurrence a page is referenced. It relates a reference number to every page, and replaces the one with the littlest reference number when a buffer casing is required.

In database buffer administration, notwithstanding buffer substitution, buffer portion is likewise an imperative and firmly related issue and is regularly contemplated together. It addresses the issue of what number of buffer edges ought to be assigned to a specific inquiry. Sacco and Schkolnick, subsequent to concentrate the page reference conduct of inquiries, proposed the outstanding hot set model to decide the ideal buffer space designation for a question.[4] Chou and Dewitt broadened this model with the DBMIN calculation that isolates the demonstrating of the reference conduct from a specific buffer administration calculation. [5]

IV. DATA MINING-BASED BUFFER MANAGEMENT

In this area, we portray our information mining-based way to deal with database buffer administration in disseminated DBMSs. Specifically; we are occupied with the problem of open buffer administration in a disseminated database framework with two levels of buffers. Subsequent to presenting the structure of such approach, we propose to utilize two sorts of learning about client get to conduct, and portray how such learning can be mined.

In addition to the traditional buffer manager in a distributed DBMS, three new components Access Information Collector, Access Knowledge Miner also, Monitor and Controller are presented in the buffer administration handle.

These components cooperate as follows:

- The Buffer Manager is in charge of the considerable number of operations on the buffer, including buffer seek, buffer arrangement and buffer substitution, and so on.
- The Monitor and Controller screens the pre-specified execution measurements of buffer administration, e.g., hit proportion. At the point when the hit proportion is underneath sure level, it signifies that the put away get to learning might be obsolete. New get to data

ought to be gathered and the get to learning database ought to be upgraded by mining from the new information sets from conventional buffer directors where most basic leadership tenets are hard-coded, it utilizes the get to information database in its basic leadership handle.

At the point when get to data is to be gathered, the Access Information Collector records the page solicitations of every exchange. The gathered information are pre-prepared by necessity of information mining process. The outcomes are put away in a get to data database

- Sufficiently after information is gathered, the Access Knowledge Miner will apply the mining calculations to the gathered information. The get to learning found is used to upgrade the get to information database. This procedure runs off-line.

V. CONCLUSION

The work revealed here is a preparatory stride towards information mining based database buffer administration. While the underlying outcomes appear to be encouraging, there remain a number of fascinating issues and open doors for future work. As we are just worried with open buffer administration issue here, one vital future work is to research how information mining results can be connected to private buffer administration. Another angle we plan to study is to use found learning to comprehend both open and private buffer assignment issues. Incremental fundamental tendencies of the found information is likewise a basic point worth examining in what's to come. At long last, as the cross-site buffer refutation effect is disregarded in this paper, it ought to enthusiasm to perceive how it will affect the execution of the framework.

REFERENCES

- [1]. R. Agrawal, T. Imielinski, and A. Swami. Mining association rules between sets of items in large databases. In Proc. of the 1993 ACM SIGMOD Int'l Conf. On management of data, pages 207-216, Washington D.C., USA, May 1993.
- [2]. B. Nitzberg and V. Lo, "Distributed shared memory: a survey of issues and algorithms," in Computer, vol. 24, no. 8, pp. 52-60, Aug.1991.doi: 10.1109/2.84877
- [3]. W.Eelsberg and T. Haerder. Principles of database buffer management. ACM Transaction on Database Systems, 9(4):560-595, December 1994
- [4]. SACCO & SCHKOLNICK, Buffer Management in Relational Database Systems, ACM Transactions on Database Systems, Vol. 11, No. 4, December 2001, Pages 473-498.
- [5]. Chou, H.T. & DeWitt, D.J. Algorithmica (1996) 1: 311. doi:10.1007/BF01840450

ARTICLES

CAR PARKING FINDER

Guided by: Mr. Vinay Sahu

Rahul Singh

TIMSCDR

Rohit Singh

TIMSCDR

Suraj Bhusan Singh

TIMSCDR

Abstract: Android World is contracting with the growth of mobile phone technology. As the number of users is increasing day by day, facilities are also increasing. Starting with simple regular handsets which were used just for making phone calls, mobiles have changed our lives and have become part of it. This project has been developed on the Car Parking Finder. Car Parking Finder purposes an android mobile application using this app we can find the parking lot space available in your area. Android requires an open source development which is probably the most feasible and a present user friendly approach. This app will display the maps with help of GPS.

Keywords: *GPS, Android*

I. INTRODUCTION

i. Existing Features

There are applications and websites available in different countries but not in India. Using this application or Websites one can check the Parking Space Available in his town. There are many Websites and Application available like BestParking.com, carparks4u.com, parkopedia.co.uk. But there is no certain Apps or Websites available in India.

ii. Problem Statement

Parking facilities now days has become a huge problem. There is lack of proper free spaces for parking due to increased unplanned housings in many places of the capital. There has been increase in the number of vehicles, but without sufficient parking spaces. Such growing number of small vehicles especially motorcycles and micro buses have created mess in the city including the increase in traffic jam. Another challenge due to the increased number of vehicles is undisciplined driving, which created obstacle for the traffic management system in cities.

II. FEATURES

Car Parking Finder deals with overcoming the problems stated above. Android application that gives necessary information about all the Parking places around you. This information overcomes the problems faced now days of parking.

i. Free Spaces or Space Not Available

This feature allows the user to know whether there is free space available in that required parking lot or not. This can be done using the sensor technology which can be used and installed on the parking lot gates.

The sensor counts the maximum number of cars and if the count exceeds it displays on the app and no further booking can be done on that parking area. When the cars gets off the parking lot the sensor detects it and lets new booking done on that lot.

ii. Schedule Parking or Advance Booking

This feature allows the user to Book the parking lot in future.

Suppose user wants to Book a Parking lot after 4 days then he can Book it in advance.

By Booking in advance there won't be any issues of availability of parking space.

III. LOCATION

This feature can be introduced using the GPS system in the app so that it lets the user to know the location of the parking lot in which they want to Book the Parking Space. This feature requires internet connection at the user phone.

i. Navigation

This feature will help user to reach the Parking lot location using GPS system.

It will be redirected to Google Maps App and will be using GPS to know your current location and it will navigate to the location of Parking lot.

ii. Payment Gateway

Using This Feature user will pay the price of Parking Space using Net-Banking, Credit or Debit Cards and at the time of reaching the location.

IV. CONCLUSION AND FUTURE SCOPE

The Conclusion of this study suggests that specific domain knowledge improves the result. The project has been planned on Android Platform. Different attributes have been implemented to the project which increases the chances of effectiveness. Using the GPS system, the application automatically displays the maps and routes to the various locations and tracks the Parking location. The application will prove useful for every user who has a issue of parking, or even tourists.

REFERENCES

- [1] <http://www.bestparking.com/>
- [2] <http://en.parkopedia.co.uk/>

ATM with Finger-Print Biometric Technology

Guided by: Ms. ReshmyRakesh

Ajith Krishnan

TIMSCDR

Akshay Mistry

TIMSCDR

Anuj More

TIMSCDR

Abstract- In nowadays an ATM machine is used for withdrawing cash with the authentication mechanism called PIN (Personal Identification Number) and with a Debit Card. For that users need to remember that PIN and they are need to secure that PIN as well. So, instead of remembering and securing we introduce a feature called fingerprint biometric key. By using Finger-Print Technique we can overcome that problem and secure Banking Transactions.

Keywords: Fingerprints, ATM

I. INTRODUCTION

The finger print minutiae features are different for each human being so the user can be identified uniquely. Instead of using ATM card Fingerprint based ATM is safer and secure. There is no worry of losing ATM card and no need to carry ATM card in your wallet. You just have to use your fingerprint in order to do any banking transaction. Unlike a password, your fingerprint or any other biometric key isn't vulnerable to brute attacks and can't be guessed.

II. EARLY DETECTION

A Very simplest way to protect your banking transaction is the bank provides an ATM card along with PIN which is known to one. By using ATM card and PIN you can protect your banking transactions. So, if you want to secure your transactions you need to carry that card and remember that PIN. So, the Finger-Print technology overcomes that problem.

III. SUGGESTED

As the sensors are provided to smart phones, PCs, Laptops and many other devices to recognise fingerprint reader and use it as a unique key or password for the data, what we suggest is the same thing to be done to the ATM machines that are used for more frequent by banking transactions.

It will be more convenient for the ATM users to just use a finger to login instead of remembering the password. If you haven't logged in for the long time there is possibility of forgetting the password or the id and if you take it down on paper or a file there is a chance of losing it and even can be misused if taken by wrong people. The chances of misuse of this much hyped 'insecure' baby product (ATM) are manifold due to the exponential growth of 'intelligent' criminals day

by day. ATM systems today use no more than an access card and PIN for identity verification.

To overcome all the aspects discussed above and many more, the idea is to simply attach a finger-print sensor to ATM machines to make it more user-friendly and even to protect it by hacking means. No Hackers would be entertained as because of the uniqueness feature of it and only the intended user would have access to their respective account.

IV. PRESENT STATUS

To overcome the work of user and even to protect banking transactions from attackers or other users a new technology came with the advancement of using biometric key functionality as a password for the ATM which was unique for every person. Finger print sensor helps the user to do banking transaction without Pin.

Even Government and private industries are heading towards digital world and therefore using biometric key for the human identification. One such example was recently observed in India in an E-aadhar process where biometric fingerprints of the citizens of the country been collected for the quicker authentication later on. Biometric Authentication Include:-

- Fingerprints
- DNA
- Face
- Hand
- Retina or
- Ear Features

V. CONCLUSION

However, this endeavour with time will be a good success as there is enough scope and a big need for a finger-print biometric key to be connected with frequently used banking transactions.

REFERENCES

- [1] <https://www.theguardian.com/money/2014/may/14/fingerprints-vein-pattern-scan-ATM>
- [2] <http://www.bioenabletech.com/biometrics-ATM>
- [3] https://en.wikipedia.org/wiki/Fingerprint_recognition

Bringing Real-life Practice in Software Project Management Training Through a Simulation-based Serious Game

Guided by: Ms. Jayashree Jain

Snehalkumar Parmar
TIMSCDR

Darshan Pawale
TIMSCDR

Ashish Tripathi
TIMSCDR

Pooja Tiwari
TIMSCDR.

Abstract: Nowadays, we can observe a lack of tools that allow teaching and assessing in Software Project Management in a more real-life way. In this paper, we discuss the need of developing tools to teach in the scope of Software Project Management, and how we can achieve that learners test their knowledge and cover the needed educational objectives, in a risk-free environment through a serious game. Hence, we propose ProDec, a simulation-based serious game to teach and assess in software project management. This tool is an attempt to surpass the limitations found in similar proposals. The paper also maps the stages of the game lifecycle to the levels of Bloom's taxonomy to show how the game helps to achieve different levels of educational objectives.

Keywords: - Software Project Management, Simulation, Serious Games, Bloom's Taxonomy

I. INTRODUCTION

After the software crisis in the beginning of the 1970s, experts began to be aware about the importance of software engineering as a means to provide a set of methods, tools and procedures for the development of quality software, within the constraints of cost and time. However, the 2011 edition of the CHAOS report found that only 37% of all Information Technology (IT) projects succeeded in that they were delivered on time, within budget, with all the required features and functions. IBM research on the reasons for IT project failure concluded that 54% of IT projects failures are a direct result of poor project management.

The importance of teaching software project management for IT learners has always been supported by organizations such as the Association for Computing Machinery (ACM) and IEEE-Computer Society in their joint task force curricula. In the Curriculum Guidelines for Undergraduate Degree Programs in Computer Science curricula recently released (ACM/IEEE, 2013), these organizations have not only highlighted the importance of this matter, but they have also emphasized the need of teaching software project management in a highly practical way, where learners can test their knowledge in real-life scenarios. By a highly practical learning, it is intended that future practitioners acquire professional practice *during*, and not after, their studies.

However, despite the importance of training in software project management, many authors conclude that software project management subjects are still basically

taught following a highly theoretical pattern and, as a consequence, learners do not show much interest in them (Ibrahim, 2011).

Compared with other degrees, such as Medicine or Aeronautics, IT learners start their professional life with a serious lack of real-life practical skills. As a result, new professionals need to develop their experience by working in real projects, where the effects of an inadequate plan or a bad decision can lead to project failure or the loss of significant profit.

A serious game is a game with the purpose of training or educating users. They can help in situations like the one described above, as tools to acquire experience and motivate learners, given their engaging nature. Moreover, simulation-based serious games allow us to bring real-life scenarios into the learning process in a risk-free environment.

In this paper, we extend a previous work on ProDec (Calderón & Ruiz, 2013), which is a simulation-based serious game for software project management training. In the scope of this work, we address the following research questions:

RQ1: What are the main weaknesses of current serious games for teaching software project management and how can ProDec overcome them? RQ2: What is the educational effectiveness of ProDec according to Bloom's taxonomy?

In order to answer these questions, we have performed the following steps:

1. We have searched and analyzed the related work on different proposals of serious games in software project management.
2. We have defined a set of criteria to compare these proposals and identified their strengths and weaknesses.
3. We have evaluated ProDec using this same set of criteria.
4. We have mapped the educational requirements defined for each level of Bloom's taxonomy with the different stages of ProDec lifecycle to find out the educational effectiveness of ProDec according to this well-known taxonomy.

This paper is structured as follows: Section 2 presents the works related to our proposal and provides a comparison of similar proposals Section 3 briefly reviews Bloom's taxonomy since that framework has been used to evaluate the coverage of learning

objectives of our proposal; Section 4 describes the serious game developed; Sections 5, 6, and 7 show the evaluation of our proposal using Bloom's taxonomy; Section 8 provides information about the state of ProDec's evaluation process. Finally, Section 9 summarizes the paper and presents our conclusions and future work.

II. ANALYSIS OF CURRENT PROPOSALS

There are several serious games in the field of software engineering education as Caulfield, Xia, Veal, and Maj show in their systematic review of the literature (Caulfield et al., 2011). However, this study also shows that the serious games that focus on software project management are scarce and have a quite specific scope. If we focus on the serious games developed for the area of software project management, the following ones are well-known examples:

- SIMSOFT (Caulfield et al., 2011) is a serious game materialized as a printed game board, that shows the players the flow of the game, and a Java-based board, where the players can see the current and historical state of the project and adjust the project's settings. It mainly focuses on human resource management, with an emphasis on how the ability of the staff affects the outcomes of the project.
- DELIVER! (Von Wangenheim et al., 2012) is also based on a printed game board designed to help learners develop the skills needed to measure and control project performance by applying the Earned Value Management technique (Project Management Institute, 2005). One of the main aims of this game is to motivate students in their learning process.
- SimSE (Navarro & Van Der Hoek, 2004) is a serious game completely developed as a software tool that is based on software project simulation. The game supports several development methodologies and focuses on the development of abilities for software process management.
- SESAM (Drappa & Ludewig, 2000) is another serious game developed as a software application that uses simulation techniques to motivate learners in learning software project management. Players take the role of a project manager and must plan and control a simulated project.
- The Project Manager Game (Games by Robc, 2013) is an online serious game where users have to allocate the most suitable staff to particular tasks and complete their project on time within the allocated budget.

In order to perform a comparison of these proposals and also to identify their strengths and weaknesses, we propose the following set of features. These features are based on our analysis and also on the ones used by Caulfield and his colleagues (Caulfield et al., 2011).

- a) F1. Coverage of software project lifecycle, that is, the phases of the project lifecycle the game deals with.
- b) F2. Coverage of the Project Management Body of Knowledge (PMBOK) (Project Management

Institute, 2013), that is, the different processes and techniques described in the PMBOK that the game helps to learn and practice with.

- c) F3. Support of revised Bloom's taxonomy (Krathwohl, 2002), that is, the level of coverage of each level of Bloom's taxonomy the game offers.
- d) F4. Support for automatic learning assessment, that is, the level to which the game helps trainers to assess the learners automatically.
- e) F5. Simulation-based, that is, if the game makes use of simulation techniques, and to which extend.

Table 1 summarizes the comparison of the serious games previously described. In this table, the columns represent the serious games analyzed and the rows are the set of features already defined.

According to the PMBOK, created by the Project Management Institute (PMI), the project lifecycle is defined by five stages: Initiation, Planning, Controlling & Monitoring, Executing and Closing. Those stages give also name to the five groups of management processes that need to be carried out with the help of techniques. All the serious games analyzed focus on a specific stage of the project lifecycle (F1) and/or help to practice a specific process or technique in that stage (F2). None of the games analyzed give learners the possibility of studying the complete lifecycle of a project from the initiating stage, where the project characteristics are defined, to the closing stage, where the project ends and it is the time for analyzing the results and deriving the lessons learnt.

If we compare the educational objectives that can be achieved by using these games with a well-known taxonomy of learning objectives such as Bloom's taxonomy, we can conclude that only SIMSOFT covers all the levels of the taxonomy.

Regarding the assessment of the skills that learners acquire by using the games (F4), all the games analyzed use traditional methods for learners' assessment, and none of them includes an automatic process of gathering and analyzing information about the game play to support an automatic assessment. Furthermore, only two out of the five games analyzed make use of simulation as a means to add realism to the game scenarios (F5). However, the two games that make use of simulation provide scenarios supported by static simulation models. This means that the scenarios the player can play are fixed offering a poor flexibility and leading to an early loss of player's motivation.

From the analysis of the current proposals of serious games for teaching software project management, we found that their main weaknesses are:

- They focus on learning specific techniques of project management or specific stages of the project's lifecycle.
 - They do not usually reach all levels of Bloom's taxonomy.
 - They do not allow to assess learner's new skills automatically.
 - They do not offer flexibility.

Taking this analysis into account, we can conclude that further research is needed to overcome the weaknesses found in the application of serious games for software

project management. For this reason, in this paper, we propose ProDec, a serious game designed to overcome these weaknesses.

Serious Game	SIMSOFT	SESAM	SimSE	DELIVER!	The project manager game
Coverage of software project lifecycle (F1)	Planning, controlling and monitoring	Planning, execution, controlling, monitoring	Planning, execution, controlling, monitoring	Monitoring	Planning
Coverage of PMBOOK (F2)	Staff Management	Staff Management	Staff Management	Earned Value Analysis	Staff Management
Coverage of Bloom's Taxonomy (F3)	All levels	Knowledge	Knowledge	Application	Application
Support for automatic assessment (F4)	Not allow to obtain automatic assessment reports				
Simulation based (F5)	No	Yes	Yes	No	No
Game Flexibility (F6)	Statically scenarios provided by the game			Static Board Scenario	Random Scenario

Table 1: Comparison of serious games for software project management.

III. BLOOM'S TAXONOMY

Bloom's Taxonomy (Bloom et al, 1956) is a widely accepted classification of learning objectives within education. It constitutes a common framework for learning proposals' assessment and comparison. In the world of serious games, this taxonomy is also used for these aims. For this reason, we have also chosen Bloom's taxonomy to assess the educational objectives that our proposal can reach.

Bloom's taxonomy refers to a classification of the different objectives that educators set for learners. It divides educational objectives into three domains: Cognitive, Affective, and Psychomotor. If we focus on the Cognitive domain, where skills revolve around knowledge, comprehension, and critical thinking on a particular topic, we find six levels sorted in a hierarchy. These levels, in ascending order, are shown below:

- Knowledge, the subject is able to recall previously learnt information. They recognize information, ideas, facts, dates, etc. in an approximate way as they have learnt.
- Comprehension, the subject is able to demonstrate the understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating the main ideas.
- Application, the subject is able to solve problems in

new situations by applying acquired knowledge, facts, techniques and rules in a different way.

- Analysis, the subject is able to examine and break information into parts by identifying motives or causes, and they are able to make inferences and find evidence to support generalizations.
- Synthesis, the subject is able to create, integrate, combine ideas, pose and propose new ways of doing. They are able to apply previous knowledge and skills to produce something new or original.
- Evaluation, the subject is able to make judgments about information, validity of ideas or quality of work according to personal opinions based on a set of criteria.

A revision of Bloom's taxonomy (Anderson & Krathwohl, 2001) establishes that in the cognitive domain there are six levels but not all are sequential in a hierarchical order. This revision proposes that the three lower levels are sorted in a hierarchical way, but the other three, the higher levels, are placed in parallel levels.

Like Caulfield, Xia, Veal, and Maj show in their serious games review (Caulfield et al, 2011) that the majority of authors in this scope are satisfied with placing their educational objectives at the basic levels of Bloom's taxonomy, even some of the proposals only reach the Knowledge one. The only exception that we found is SIMSOFT that reaches the higher levels of the taxonomy.

In the following sections we describe the different stages of ProDec and we perform an analysis of Bloom's taxonomy levels that our proposal satisfies.

IV. PRODEC OVERVIEW

ProDec is a serious game to teach and assess learners in software project management. Its main goal is that learners acquire decision-making skills on problems that can appear within a software project lifecycle. Consequently, it helps learners start their professional career with some practical abilities for their profession.

The aim of the game is to successfully manage a software project. The game is over when the project significantly overruns either the approved budget or the allocated time. The player wins when they are able to complete the project within the time and cost limits. Besides, ProDec not only focusses on problem solving during the executing and controlling stages of a software project, but it also invites players to fully plan their own project and then monitor and control its progress by simulating its execution.

At the same time, ProDec helps trainers in the assessment of the skills that learners must acquire by playing the game. To do this, ProDec accepts the assessment criteria as an input of the trainer, and automatically: a) gathers data about these criteria during the game plays, b) analyzes the data collected, and c) shows an assessment report for the learner and the trainer.

ProDec is a game to be played in teams, so that it can also help to develop some soft skills in project management such as leadership and communication

skills. Actually, ProDec does not teach learners the basic principles of software project management. Before playing, the players need to acquire these principles in lectures. Therefore, ProDec is a tool to be used in advanced stages of an academic course. Although the game is thought to be used by teams, it can also be played individually.

V. ONSET PHASE

ProDec's Onset phase is the first contact that learners have with the game. If the players select to play a quick game, they have to go through the different project scenarios available in the game and read and evaluate each project's features. In this case, learners need to know the main concepts and principles about software project management and need to understand the information and data that the game shows, so that they can get an idea about the difficulty of each proposed project scenarios. So, in this phase, learners need to *remember* and *comprehend* the information provided about the software projects to begin the play successfully. In this way, Knowledge and Comprehension levels of Bloom's taxonomy are covered.

On the other hand, if players select to play a full game, they follow a process that guides them in making the software project plan. This process is made of five sequential stages and allows learners to provide all the data needed to create a new software project plan. The stages that make this process are the following: project information, size estimation, project team definition, tasks definition and risks analysis.

i. Project Information

Project Information is the first stage of the process of creation of a software project plan. In this stage, learners have to enter the general information of the project about its scope and features, such as the salary of the workers, the length of the project, the numbers of use cases, etc., that are necessary to begin the size estimation stage. In order to do this task, learners need to know and understand the different concepts about software project information that the game uses. If learners do not know or understand properly these issues, it is likely that they will end up in a failed game, as it happens in real life, where a project misinterpretation leads to a failed project. The training about the concepts used in the phase of the game has to be offered during the lessons taken before playing. As in this stage, in all the next stages of this process learners need to know, properly understand and remember the concepts learnt in the lectures, so that the data they provide to the game is consistent. Hence we can see that Knowledge and Comprehension levels of Bloom's taxonomy are covered by the game.

ii. Size Estimation

In this stage, players provide the estimate of the size of the project starting with the total number of use cases. Then, learners need to calculate and

enter the size of each use case. To estimate the size of each use case, learners use Albrecht's Function Point Analysis (Albrecht, 1979). A function point is a unit of measurement to express the amount of functionality of an information system. In this stage of the game, learners need to *apply their knowledge* to calculate the different size of the use cases before entering the data to continue. Consequently, the Application level of Bloom's taxonomy is covered.

Besides, in this stage learners apply Albrecht's technique and get the results of under- or over-estimating in real-life project scenario, which is a different situation to the traditional one focused on blackboard activities.

iii. Project Team Definition

During this stage, learners design their project team by defining its members. For each team member, players have to select some features for their personality and past work experience. Currently, the personality of an employee is made of two traits that the player has to select from a range of twenty two available ones. The set of personality traits included in the game is based on the sixteen personality factors described by Cattell (Cattell et al. 1988). In this stage, the game helps learners to think about the different outcomes of mixing personalities in a team and the importance of achieving a good team synergy in a successful project.

iv. Tasks Definition

Once the size has been estimated and the project team designed, the following stage asks players to define the project tasks. In this stage of the process, players define the project tasks, and enter, for each of them, the time data, the budget allocated, and its predecessor tasks. Consequently, this stage asks the player to provide the information gathered in a PERT diagram (Moder, 1983) of the project. PERT technique is recommended in PMBOK's Time and Cost knowledge areas and it is included in the Project Management Professional (PMP) exam. This function allows learners to apply their knowledge about PERT diagrams in real-life scenarios and to analyze its features within a project unlike more traditional approaches where knowledge is exclusively acquired by solving individual exercises during the lectures. Besides, in this stage, players have also to allocate tasks to the team members. To do this successfully, they need to analyze all the information entered about the tasks description and the personality traits and work experience of the team members with the aim of allocating the most suitable staff to each task. It can be seen that the Analysis level of Bloom's taxonomy appears in this stage of the game.

v. Risk Analysis

The last stage of the process that players follow to make the software project plan is the risk

assessment and analysis. As its name indicates, in this step, the players perform the quantitative analysis of the risks that can appear along the execution of the project. In a quantitative risk analysis, players need to enter the risk probability and the loss magnitude for every risk identified. The risk probability is the likelihood of occurrence of a risk. The loss magnitude is the potential loss the project may suffer in the case that the risk appears and it is not properly controlled. Later, these risks will be transformed into events of the simulation model. The probability that these risks occur is defined by the risk probability. The loss magnitude establishes the time delay that the tasks being performed at the moment when the event occurs suffer.

Based on the knowledge acquired in the lectures and the information entered about the project, the players are required to analyze the project within its scope with the aim of making a proper list of the risks to be taken into account. Again, we can see how the Analysis level of Bloom's taxonomy is covered. Along all the onset phase, learners have to analyze all the elements of each stage to get information and synthesize this information into new ideas and decisions to make. Moreover, given the social character of the game, before making a decision such as allocating staff to a task or defining the probability of a risk, players need to analyze the information of the project to argue, defend, discuss, evaluate, negotiate and agree the best decision within their team to make a good project plan. This feature allows the learner to work at the highest levels of Bloom's taxonomy which are Synthesis and Evaluation. Hence by playing a full game, ProDec provides a full coverage of Bloom's taxonomy.

VI. EXECUTION PHASE

The second step consists on executing the project created or selected in the previous phase. To support this project lifecycle phase, ProDec automatically generates a source code file with the equations of a discrete-event simulation model that simulates the project described in the first phase of the game. In addition, the file also contains the source code of the user interface for the specific simulation model generated. It is important to notice that this feature helps ProDec achieve a high level of flexibility given that the number of different projects that can be simulated is unlimited.

To achieve this flexibility, we have performed a reverse engineering process. We have analyzed how the simulation software used implements the elements of a discrete-event simulation model, and then, we have generalized the procedure with the aim of building the simulation models in an automatic way. Working like this, ProDec is able to simulate any project plan the players create overcoming the lack of flexibility found in other proposals previously described.

Once the source code of the simulation model is

generated, the simulation model is launched and the players start managing the project. During the simulation of the project execution, the game shows the players several screens where the progress of the project is presented and different actions are provided to control the project. In this phase, learners practice two main concepts. On the one hand, they put into practice their knowledge about the Earned Value Analysis (EVA) for monitoring the progress of the project.

On the other hand, the learners practice their decision-making skills by correcting the potential deviations of the progress of the project from the goal of ending the project within the time and budget. If a corrective action is needed, players select it from a set of actions such as hire a team member or reorganize the project team.

In this phase of the game, players need to analyze the information presented in different screens for controlling and monitoring the progress of the execution of the project. For this, learners use their knowledge about software project management to understand the information about the progress of the project provided by the game. They also have to analyze, create, discuss, argue, evaluate and negotiate within their team to agree on the best decisions in each moment. In this stage, the game also presents a full coverage of the six levels of Bloom's taxonomy.

VII. END PHASE

The last phase consists on the players' assessment. By using the information that ProDec has been recording during the game play and the assessment criteria established by the instructor, ProDec generates an assessment report of the learners describing their level of achievement. These information records come from several sources within the game such as the project plan with the initial estimates, the project monitoring data and the kind of decisions that the players made during the play.

The assessment criteria are provided by the instructor in the form of a rubric. An assessment criterion links the information recorded in the rubric with the information recorded during the game. By using a labelling system the labels describing the skills of an assessment criterion are matched with the records of the game that contain the information needed to assess such criterion. As a consequence, ProDec is able to perform the learners' assessment by analyzing the information recorded during the game and applying the assessment criteria set by the instructor, concluding with the generation of a detailed assessment report that describes the skills acquired by the players. The generated report allows players to analyze the course of the game play with the aim of learning about their experience. At this point, learners can learn from their own mistakes and can analyze the events occurred along the game to get new knowledge and generate new ideas for future plays.

In this stage, the highest levels of Bloom's taxonomy are also covered.

VIII.CONCLUSION

In Section 2, we presented a comparison between several serious games attending to a set of features considered to be of importance in a game for software project management training. We showed that none of the analyzed games fully satisfies all the mentioned features. In this paper, we proposed ProDec, a simulation-based serious game for software project management, which aims to teach, assess and motivate learners in learning and practicing the principles of software project management as well as improving some important soft skills, like project leadership, in a risk-free environment provided by project. Thus, learners can experiment their abilities with real life scenarios without costs or risks.

ProDec has been developed with the aim of having a tool that satisfies all the criteria that other serious games in the field do not cover. Therefore, ProDec is a serious game that:

- a) Opposite to the majority of the serious games in the field, which are focused on a specific stage of the project lifecycle or the training of a specific technique, allows learning along the whole project lifecycle. To achieve this, players can start a software project plan from scratch, improve their skills in decision-making, analyze the log of games played in the past, etc. ProDec offers a sufficient coverage of all the levels of Bloom's taxonomy, from the Onset stage until the End stage of the game lifecycle.
- b) ProDec also allows trainers to assess the learners' skills through the information reports that the tool generate during the game play. Besides, at the end of a play, ProDec automatically provides an assessment report with detailed information about the events occurred in the game. Learners can then analyze their game experience to achieve new knowledge and improve their abilities in software project management.

Finally, ProDec is a simulation-based serious game. This means that it uses simulation to execute the software projects, planned by learners and instructors, so that players can practice decision-making in the scope of project controlling and monitoring processes. As a remarkable feature, ProDec generates in real time the source code of the specific discrete-event simulation model for the created or selected project together with the appropriate user interface. This feature makes ProDec a completely flexible tool regarding the unlimited project scenarios that can be simulated, and, therefore, played.

To sum up, along this paper we have shown how ProDec is a flexible tool, covers the levels of Bloom's taxonomy, allows players to take contact with all the lifecycle of a project and helps professors to assess learner's skills, overcoming the weaknesses identified in current proposals, answering to our first research

question. Besides, we have analyzed how ProDec reaches the six levels of Bloom's taxonomy by analyzing the player's behavior ProDec demands at its different lifecycle stages, answering, this way, our second research question.

Our aim is to create a tool to support the effective practical training of the processes of software project management. We believe that this kind of tool is needed to prepare the new practitioners for their professional life in the best possible way. For this reason, we are currently working to improve the features of ProDec to increase learners' soft skills such as project leadership, motivation, engagement and competitiveness. To achieve these goals, we are also studying the benefits of integrating our game with social networks and adopting gamification strategies for enriching the learning process.

Moreover during the first semester of 2014 the tool is being evaluated with real learners. The lessons learnt from this process will be used to measure the effectiveness of the learning and assessment processes when using ProDec and to improve the game.

REFERENCES

- [1]. ACM/IEEE -CS, 2013. Computer Science Curricula 2013. Curriculum Guidelines for Undergraduate Degree Programs in Computer Science. December 20, 2013 The Joint Task Force on Computing Curricula Association for Computing Machinery (ACM) IEEE Computer.
- [2]. Albrecht, A. J., 1979. Measuring application development productivity. Proceedings of the joint SHARE, GUIDE, and IBM Application Development Symposium, Monterey, California, IBM Corporation, pp. 83-92.
- [3]. Anderson, L. W., and Krathwohl, D. R., 2001. A taxonomy for learning, teaching, and assessing: a revision of Bloom's taxonomy of educational objectives.
- [4]. Longman, New York. Bloom, B. S., Engelhart, M. D., Furst, E. J., Hill, W. H., and Krathwohl, D. R., 1956. Taxonomy of educational objectives: the classification of educational goals. Handbook I: Cognitive Domain. New York, Longmans, Green.
- [5]. Calderón, A., and Ruiz, M., 2013. ProDec: a serious game for software project management training. The 8th International Conference on Software Engineering Advances. ICSEA, 565-570 Venice. Italy.
- [6]. Ibrahim, I., 2011. Teaching project management to IT students: methods and approach. 2nd International Conference on Education and Management Technology. IPEDR. Vol. 13, 185-191. IACSIT Press. Krathwohl, D. R., 2002. A revision of Bloom's taxonomy: An overview. Theory into practice. 41(4), 212-218.
- [7]. Moder, Joseph J., 1983. Project management with CPM, PERT, and precedence diagramming. 3rd ed. New York: Van Nostrand Reinhold.
- [8]. Caulfield, C., Veal, D., and Maj, S.P., 2011. Teaching software engineering project management-A novel approach for software engineering programs. Modern Applied Science, 5(5), 87-104.
- [9]. Caulfield, C., Xia, J. C., Veal, D., and Maj, S. P., 2011. A systematic survey of games used for software engineering education. Modern Applied Science, 5(6), 28-43.
- [10]. Games by Rocs, 2013. The project management game. <http://thatpgame.com/> [retrieved: December, 2013].

Recruitment In IT Sector

Guided by: Ms. Rydhima Chopra

Khushboo Pandey
TIMSCDR.

Saurabh Pandey
TIMSCDR.

Sudhanshu Pandey
TIMSCDR.

I. INTRODUCTION

Information technology refers to the digital processing, data storage and network communication of information of all kinds. IT can be defined as computing and telecommunication technology that provides automatic means of handling information. IT includes components such as software and hardware. IT –led services includes the following: Product support process outsourcing, hardware and software development and maintenance, training and education, IT outsourcing, system integration and application development. Therefore, IT can potentially be used in every sector of the new economy.

i. Objective of Study

The following are the objectives of the study:

1. To understand the recruitment methods employed in IT companies.
2. To compare recruitment methods between Indian and MNC IT firms
3. To meet the objective of the study, the research was divided into the following areas:
 - Study of Recruitment process.
 - Investigation of the constraints faced by the recruiters and candidates.

ii. Methodology

The methodology adopted for the study are as follows:

1. Desk Research.
2. Identification of sources of information about recruitment and selection in Information Technology sector.
3. Data Collection through information / data collected from the web-sites whenever available .
4. Compilation and analysis of data

II. REVIEW OF LITERATURE

Recruitment and selection lie at the core of how businesses obtain human resource required to maintain a sustainable competitive advantage over its competitors in the market. Staffing personnel and especially managerial personnel in the organizations may well represent one of the most important human resource management functions. Information

technology essentially refers to the digital processing, storage and communication of information of all kinds. The IT sector in India is generating 2.5 million direct employments. India is now one of the biggest IT capitals of the modern world and all the major players in the world IT sector are present in the country The present article focuses on how efficiently the IT sector follows the Recruitment & selection processes.

A. Definition:

Recruitment (hiring) is a core function of Human resource management. Recruitment refers to the overall process of attracting, selecting and appointing suitable candidates for jobs (either permanent or temporary) within an organization. Recruitment can also refer to processes involved in choosing individuals for unpaid positions, such as voluntary roles or unpaid trainee roles. Managers, human resource generalists and recruitment specialists may be tasked with carrying out recruitment, but in some cases public-sector employment agencies, commercial recruitment agencies, or specialist search consultancies are used to undertake parts of the process. Internet-based technologies to support all aspects of recruitment have become widespread.

B. Evolution

• Framework of IT Industry:

The important factor or the driving force for the Indian IT services and ITES industry has been the changing global business landscape, which has exerted performance pressures on multinational enterprises. Our nation has emerged as an important venue for the services sector including financial accounting, call centres, and business process outsourcing. Technology and Bio informatics, which are on Government 's priority list for development, offer scope for FDI.

• IT Industry - Its growth and Development:

IT services and business process outsourcing(BPO). The sector has increased its contribution to India's GDP from 1.2% in 1998 to 7.5% in 2012. The sector aggregated revenues of US\$147 billion in 2015, where export revenue stood at US\$99 billion and domestic at US\$48 billion, growing by over 13%. India's current prime minister Narendra Modi has started 'Digital India' project to give IT a secured position inside & outside India.

• **Trends in Recruitment:**

Technological developments, labor market shortages and competency based selections are the three major trends in HR area. When inquired about the most important trends in HR area relating to recruitment and selection, the respondents opined that outsourcing of selection (59.7%), competency based selection (57.1%) and selection in tight labor markets (50.6%) are the important ones. The responses. E-recruitment and Team selection are identified as emerging trends by 42.9% of the respondents. Though there are many consultancy firms engaged in recruitment and selection processes, —Specialization of consultancy.

• **Changes faced by HR managers across organization:**

The top five challenges faced by Indian HR managers are:

- i. Change management
- ii. High employee expectations
- iii. Industrial relation
- iv. Retention of talent and
- v. Recruitment, identification & hiring of right talent

For MNCs a reverse order is found.

• **Concern for Recruitment:**

To what extent the organizations are today concerned about attracting and retaining employees? Analysis across the type and size of the organizations, shows that there is no significant difference between Indian organizations and MNCs and also small and large organizations in this regard.

• **Importance of Recruitment Processes:**

What are the important elements in the processes of recruitment? Organizing recruitment Where is the recruitment decision located? Is it centralized at head quarters or decentralized at enterprise division or branch level? Who is responsible for recruitment and selection?

III. RECRUITMENT METHODS

In recruitment process the role of recruitment methods is significant. Many innovative methods are developed to make recruitment effective. The following are the important levels of recruitment.

- i. Managerial positions : Promotion from within,
- ii. Technical and professional: Transfer from other firms
- iii. Entry level positions :employee referrals and direct applications and walk-ins.

i. Effective recruitment methods:

Now the question is which of the methods employed by the organizations are perceived to

be effective? Effective methods include both formal (Placement /recruiting agencies, Campus recruitment, direct applications/Walk ins, and Job fairs) and informal ones (employee referrals and job posting done internally). Except employee referrals all other methods more effective are formal ones.

ii. Selection techniques:

What kind of selection of tools do companies employ to select employees for their organizations? Earlier research has proved that companies employ a variety of tools to select employees for different positions. Hence the following hypothesis is framed to guide the research.

- Interviews
- Skills or knowledge tests
- Panel interview with several experts
- Aptitude tests
- Psychometric Tests.

iii. Expectations of job seekers:

It is proposed to examine the factors that influence job seekers in applying for a job.

- Pay and benefits
- Features of perspective jobs
- Training opportunities
- Growth prospective of the company
- Location of the Job.

iv. Views on Job Attraction

What do the HR managers think of the ways to attract job seekers?

- Company images has influence on intentions to apply for the job seekers
- It is easy for the large companies to attract the best talent.
- Hiring the best talent is more of a chance despite the systematic recruitment processes.

v. Competencies found Weak among applicants:

Often the recruiters say that they have tough time in finding right candidate for the right job. Some of them are as listed below.

- Dealing with change
- Problem solving
- Creativity
- Communications
- Basic skill
- Team skills
- Interpersonal skills
- Work orientation
- Technical skills.

IV. FUTURE OF RECRUITMENT

The Indian IT market currently focuses on providing low cost solution in the services business of global IT. Presence of Indian companies in the product development business of global IT is very meagre, however, this number is slowly on the rise. US giants that outsource work to India, do not allocate the high end SDLC (Software Development Life Cycle) processes like requirement analysis, high level design and architectural design, although some Indian IT players have enough competency to take up and successfully complete these high level software jobs. The other prominent trend is, IT jobs, that were earlier confined to Bangalore, are slowly starting to experience a geographical diffuse into other cities like Chennai, Hyderabad and Pune. The growth is not fast paced; this can be largely attributed to the lethargic attitude of the government in providing proper telecommunication infrastructure.

The penetration levels are higher for mobile, but the speed at which the backbone infrastructure works (network speed) and the coverage it offers are far below what other countries of the world have currently in offer.

REFERENCES

- [1]. <https://www.villanovau.com/resources/hr/human-resource-management-challenges/>
- [2]. <http://smallbusiness.chron.com/methods-recruitment-selection-2532.html>



ABOUT THE INSTITUTE

Thakur Institute of Management Studies, Career Development and Research was established in the year 2001 with a clear objective of providing quality technical education in tune with international standards and contemporary global requirements, offering 3 years postgraduate degree in Master of Computer Applications (MCA). The Institute is recognized by the AICTE norms and is affiliated to the University of Mumbai.

The Management's commitment to excellence is reflected in the marvelous infrastructure that is comparable to the finest institution of its type in the country. The sprawling campus with lawns, gardens, playgrounds, parking area, hostel accommodation and temple ensures a right academic ambience essential for a center of higher education.

At TIMSCDR, the importance of faculty is well understood which is reflected in qualified and experienced teaching staff. A closely monitored quality, assurance mechanism ensures proper coverage of syllabus within right time frame.

Application of modern technology in teaching-learning process and day to day governance of the Institute makes TIMSCDR unique. The organization supported by dedicated 16 Mbps broadband internet connectivity and also has WI-FI facility.

The Institute focuses on imparting knowledge to the students that persists even when they pass out and step into the corporate world. The syllabus has been given a new dimension through experienced faculty and state of the art infrastructure. The overall personality development through extra curricular activities like quiz, debates and seminars to name a few have been a hallmark of the Institute.



Thakur Educational Trust's (Regd.)
THAKUR INSTITUTE OF MANAGEMENT STUDIES, CAREER DEVELOPMENT & RESEARCH
(Approved by AICTE, Govt. of Maharashtra & Affiliated to University of Mumbai)

Thakur Educational Campus, Shyamnarayan Thakur Marg, Thakur Village, Kandivali (E), Mumbai - 400 101

• **Tel:** 6730 8301, 02, 28840484/91 • **Telefax:** 28852527

Email : timscdr@thakureducation.org • **Website :** www.timscdrmumbai.in • www.thakureducation.org