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AIM

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

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Thakur Institute of Management Studies, Career Development & Research will become a premier institute renowned internationally for providing education in software application to graduates from various disciplines.

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PEO-2 : To enable students to analyze problems and to design and develop software solutions using emerging tools and technologies.

PEO-3 : To enable students to continue Life-long learning, Research and Entrepreneurial pursuit in their chosen fields.

PEO-4 : To develop communication, teamwork, and leadership skills necessary to manage multidisciplinary projects and serve the society as responsible and ethical software professionals.

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11. **Individual and Team Work -** Work as a member or leader in diverse teams in multidisciplinary environments.
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Editorial

The tenth volume of the Research Journal, Tech Tonics – TIMSCDR Research Journal is a compilation of scholarly research papers and articles written by students of MCA (Master of Computer Applications) course of TIMSCDR. The contents of the research papers and articles of this edition pertain to the application of Information Technology in the domains of Agriculture and Medicine.

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

The Journal represents research work in various specializations in Information Technology like Internet of Things (IoT), AI, Big Data etc. including topics form Waste Management in Agriculture and Medicine.

To ensure originality of the research work, the research papers and articles were thoroughly checked for plagiarism and then selected for publication. The students got an opportunity to understand the relevance of standard research work through this academic exercise.

The tenth edition of Tech Tonics, 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 its diverse Applications.

Editor
Dr. Vinita Gaikwad

Director, TIMSCDR

RESEARCH PAPERS

Automatic Smart Waste Machine: A Review

Guided by Dr. Vikrant Shaga

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***Abstract*– Modern world meets lots of disputes that include Smart waste management system. It is become matter of big worry if proper disposal system is not managed. Managing waste effectively and recycling efficiently, entire nation can ahead one step forward. In this paper we have reviewed, an automatic sorter machine is developed which can sort out the wastes in various categories to make waste management easier and efficient. It can be possible to sort out metal, paper, plastics and glass by developing an electromechanical system using microcontroller and operational amplifier. For sorting metal and glass conventional sensors are used and for sorting paper and plastics a sensor using LASER and LDR is used. A weight sensor and counter is used to find out the amount of sorted materials. By using the proper recycling system, the use of waste will turn into useful product for the civilization. The sorting procedure will make recycling more efficient. By means of this waste sorter, the conventional waste management system will be transformed into SMART system. This SMART system will help to make our environment more suitable for living, reducing global warming and making the world healthier.**

Keywords – ***Automatic Sorter Machine; Smart waste management; Microcontroller; Operational amplifier, Microcontroller, Sensor implementation.***

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I. INTRODUCTION

To get rid of unwanted material or waste, people used various methods of waste disposal. Sometimes it was buried in the land, thrown in the sea, fed to the animal or burnt. Getting rid of unwanted material is always a major concern for the civilized society. The popular diseases that affect the Europeans are Bubonic Plague, cholera and typhoid fever, they were perpetuated by filth that harboured rats, and contaminated water supply. When wastes are not properly managed then it may cause serious hazard, as seen in 1350. "Black plague" erupted and more than 25 million people from all over Europe fall victim to it in just five years. There is an increasing rate of waste generation in Bangladesh and it is projected to reach 47,064 tons per day by 2025.[1] The Waste Generation Rate (kg/cap/day) is expected to increase to 0.6 in 2025. A significant percentage of the population has zero access to proper waste disposal services, which will in effect lead to the problem of waste mismanagement. The total waste collection rate in major cities of Bangladesh such as Dhaka is only 37%. When waste is not properly collected, it will be illegally disposed of and this will pose serious environmental and health hazards to the people of Bangladesh. This is not the only problem of Dhaka city but also for other big cities around the world. With so much concern recently about being greener and economically friendly, waste management has become a very important topic. People and companies are starting to realize that the things they use and the way they dispose of them can make a big impact on our world. Proper management of waste plays a vital role in global environment. That is why a waste sorting system is designed which can be used in houses, offices, industries as a part of smart waste management system.[2] [3]

II. PRESENT STATUS OF SOLID WASTE GENERATION

Present condition of the solid waste generation can be described in different point of views. The generation and management of solid wastes are described in World and Bangladesh perspective.

A) Scenario in World

Confederation of European Waste to Energy Plants (CEWEP) and European Environment Agency (EEA) provides sound, independent information on the environment

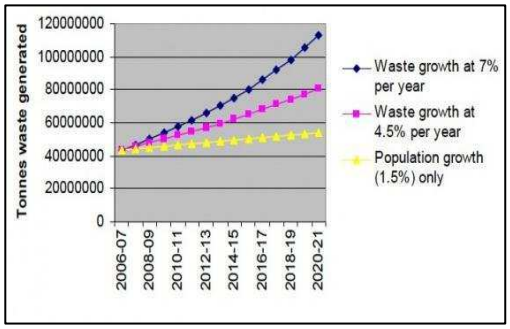

Fig. 1 Comparative waste generation 2006-07 to 2020-21. [3]

Fig. 1 has been generated from the corresponding data from CEWEP and EEA. Considering present condition, waste growth at 7% per year is plotted. Considering future waste reduction, waste growth at 4.5% per year is plotted. Fig. 1 illustrates the fact about the total generation of wastes around the world. The total amount is increasing day by day and hence the waste management is becoming a challenge for both the developed and developing countries. Hence, recycling is becoming very important. Recycling is a resource recovery practice that refers to the collection and reuse of waste materials such as empty beverage containers. The materials from which the items are made can be reprocessed into new products. For recycling the waste is required to separate into various different bins. As it enables

us to convert waste into a valuable resource, gradually this practice is gaining popularity.

B) Scenario in Bangladesh

The waste generation amount by Zone at Dhaka metropolitan city, Bangladesh is shown in Fig. 2.

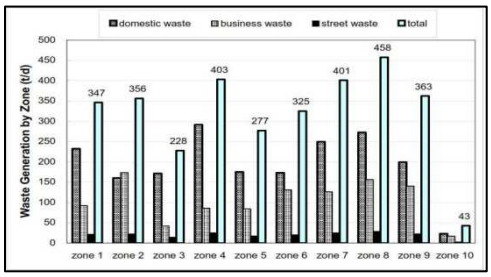

Fig. 2 Waste generation amount by zone at Dhaka metropolitan city, Bangladesh [3]

The zonal average of waste generation is estimated at 320 t/d (tones per day) with the maximum at approximately 460 t/d in Zone 8 and the minimum at 43 t/d in Zone 10. The zonal waste generation reflects the population size and business activities in each zone. [3]

III. METHODOLOGY

The system activates when the IR detects some sorts of material is being put on the system tray. Then at first the weight sensor activates and find out the weight of the trash, then the metal sensor and glass sensor starts their actions. If metal sensor detects the material as metal, then a servo motor will put that trash in the bin 3 (which is dedicated for metals). If the glass sensor detects glass then it will perform same action and put the trash in bin 4. If both sensors fail to detect then the LASER and LDR activates. If the LASER passes through the trash then it is decided as a transparent and moves to bin 2. If the LASER fails to pass then the material is decided as Paper and move to bin 1.[4]

IV. SORTING SYSTEM DETAILS

The sorting system consists of Light Dependent Resister (LDR), LASER, Infrared (IR) transmitter and receiver, Metal Sensor (Capacitive proximity sensor *E2K-C*), glass sensor (Omron E3SCR67C), Weight Sensor (MLC900 micro weight sensor) and a Liquid Crystal Display (Alpha-numeric 16*4 LCD). The whole program is run by a microcontroller (PIC 16f877A).

A servomotor (HS-65MG, Mighty Metal Gear Feather Servo) based electro-mechanical system works as an actuator which puts trash in the desired bin. The microcontroller will count the trash sequence number and also the total weight of definite type of wastes.[3][4]

V. ELECTROMECHANICAL SETUP

An Automatic Sorter Machine setup consists four Bins. Each Bin is used to contain unlike materials. Bin 1 is for Paper, Bin 2 is for Metallic elements, Bin 3 is for Plastic elements and Bin 4 is for Glass particles. At first, the object is placed at the Detection zone. The sensor applies its sensing activity to detect the material. Sensing signal is moved to microcontroller and final output signal comes out from microcontroller that run the servo motor to a definite direction depending on the material that is being sensed.

The servo motor is paired with some type of encoder to provide position/speed feedback. This feedback loop is used to provide precise control of the mechanical degree of freedom driven by the motor. A servomechanism may or may not use a servomotor. For example, a household furnace controlled by a thermostat is a servomechanism, because of the feedback and resulting error signal, yet there is no motor being controlled directly by the servomechanism. Servo motors have a range of 0°-180°.

The Servo motor is controlled by sending a pulse of variable width by the microcontroller. The control wire is used to send this pulse. The parameters for this pulse are that it has a minimum pulse, a maximum pulse, and a repetition rate. Given the rotation constraints of the servo, neutral is defined to be the position where the servo has exactly the same amount of potential rotation in the clockwise direction as it does in the counter clockwise direction. It is important to note that different servos will have different constraints on
their rotation but they all have a neutral position, and that position is always around 1.5 milliseconds (ms). The angle is determined by the duration of a pulse that is applied to the control wire. This is called Pulse width Modulation. The servo expects to see a pulse every 20 ms. The length of the pulse will determine how far the motor turns. For example, a 1.5 ms pulse will make the motor turn to the 90 degree position (neutral position). When these servos are commanded to move they will move to the position and hold that position. If an external force pushes against the servo while the servo is holding a position, the servo will resist from moving out of that position. The maximum amount of force the servo can exert is the torque rating of the servo. Servos will not hold their position forever though; the position pulse must be repeated to instruct the servo to stay in position.[4][5][6]

VI. FUTURE SCOPE

Automatic Sorter Machine for Smart Waste Management System can be deployed to solve our existing problem as well as can bring about a change in our daily life meeting our own demand.

- *Sorting More Types of Materials*
- *Reduction of Cost*

V. CONCLUSION

In communities where appropriate sites are available, sanitary landfills usually provide the most economical option for disposal of solid waste. However, it is becoming increasingly difficult to find sites that offer adequate capacity, accessibility and environmental conditions. The amount of waste, which is been recycled or reused, stands for the reduction of waste to be managed by the authority. Proper management of waste plays a vital role to control global warming. Automatic Sorter Machine for Smart Waste Management System is an excellent example of proper waste management. It will also ensure effective recycling system. Hence, the improvement of waste sorter will ensure economic and ecological development

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Use of IoT to improve City's Waste Management Activities

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Abstract-- We have experienced it a lot of times in our city that the garbage bins or dustbins placed at public places are overloaded. It creates unhygienic conditions for people and also makes that spot ugly leaving a foul smell. To avoid all such situations we are going to consider a solution that combines unique ultrasonic Smart Sensors that monitor waste in real-time using IoT or GSM with sophisticated software (Analytics tool, Route Planner and Management system) providing cities and municipalities with data-driven decision making, and optimization of waste collection routes, frequencies and vehicle loads, resulting in overall waste collection cost reduction and carbon emission reduction in cities.

IoT based smart waste management solution empowers cities to manage and battle ever-growing volumes of municipal waste. Large-scale urbanization and industry growth are the causes of the growing volumes of waste. Because of the modern lifestyle that the world is leaving we produce much more waste per citizen than only a decade ago. Almost 66% of the world´s population will live in cities by 2050, according to the study conducted by the United Nations. If we intend to properly mitigate the risk of rising waste management problem because of all these factors, our cities need a sophisticated and efficient tool to manage waste, monitor garbage bins with ultrasonic sensors, modify the capacity of bins as per the area's need and optimize collection routes.

Keywords—IoT, Smart, Waste Management.

I. INTRODUCTION

1.1 Background

The Internet of Things (IoT) is a concept in which surrounding objects are connected through wired and wireless networks without user intervention. In the field of IoT, the objects communicate and exchange information to provide advanced intelligent services for users. Owing to the recent advances in mobile devices equipped with various sensors and communication modules, together with communication network technologies such as Wi-Fi and LTE, the IoT has gained considerable academic interests.

Cities can improve the well-being of citizens with the IoT based smart waste management solution. The implementation of such solution helps to optimize the capacity of bins and to promote separation of recyclables by residents. With proper management of waste, there is always be enough space for people's trash – general and separable. Unnecessary traffic blockage and overflowing bins can be avoided by focusing on need driven waste collection. Urban areas, therefore, progress toward becoming cleaner and free of litter.

The amount of data collected by the sensors can be leveraged using Big Data which will help us plan our resources efficiently. For example, an area where the waste bins frequently overflow can be provided an extra waste bin from an area where one of the waste bins is mostly unused. There is no dearth of the variety of sensors which can be found useful in some or the other area of the waste management cycle.

1.2 Problem Statement

The inefficient waste collection methodologies lead to unnecessary traffic blockage and overflowing bins. The amount of fuel wastage that happens when the waste truck simply runs across the city to collect waste from bins irrespective of whether they were full, half-empty or empty is considerable enough and not to mention the carbon emission from those big trucks. Though this can be avoided by using real-time data monitoring and analyses, provided by the IoT based smart dustbins and analytics based smart route optimization it helps to avoid collecting empty or half-empty waste bins and only concentrate on the localities that needs immediate waste collection services.

II. METHODOLOGY USED

In this paper qualitative research method is used, which allows us to understand the human behaviour and why people do what they do as well as what they think about the problem in consideration.

The general people say that once the garbage bin becomes full they still throw their garbage on top of that which results in the inability to close the lid of the bin properly and after a point the garbage starts spilling outside the bin. This causes the nearby place to fill with the stench.

People are of the opinion that timely emptying of the garbage disposal bins could keep the surrounding clean and avoid piling up of the garbage.

Speaking with the workers of the Municipality waste department it was found that they were following the decade old practice of following the garbage pickup schedules which are very rigid and doesn't allow much flexibility.

At the same time speaking with members of the Municipality waste department employees they were excited and positive about the idea that would allow them to see the actual fill-level of all bins monitored by smart sensors. The concept of finding all the important information related to the specific bins and stands – their address & GPS position, status, code, volume and type of waste they are reserved for, would help them manage their task better. Keeping the driver in loop about the actual fill-level, and the prediction of when the bins are expected to reach full capacity can allow them to optimize their routes dynamically.

While the advantages of this project can be clearly seen from the point of views of the people interviewed above but there are also a couple of hurdles that have to be considered before the project execution. Cost of applying system will definitely shoot up the price per dustbin, the maintenance cost for the IoT device due to wear and tear, training cost of the members of the Municipality waste management department.

III. DATA AND RESULTS

This project is important to the waste industry, because the process of physically collecting waste is estimated to account for up to 80% of waste management costs. A small step towards optimizing the waste collection process can result into significant savings for the city which can be further invested to strengthen the recycling infrastructure. Taking advantage of the modern technologies like IoT and Big Data can help us tackle this problem in a way that was a moon shot couple of years ago.

IV. CONCLUSION

From the analysis, it can be deduced that the use of IoT is feasible and need of the time to change the way we collect our waste. The limitation of this lies in the fact that we need to keep the cost of these smart bins at a cost affordable and convince the government functionaries that it's an investment that would give them considerable returns in the form of reduced functioning cost and the environmental benefits it produces.

V. RECOMMENDATIONS

We recommend that city collects more data on their internal operations in order to optimize their waste management practices. Internal data includes:

- Data on financial operations
- Data collected at transfer stations
- Data on the shipment of waste between facilities

We also recommend doing thorough testing of the sensors and see whether it qualifies as an all weather solution. False alarms about waste bin capacity can confuse the system and increase the cost contrary to its intention of reducing it.

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Use of AI in Teaching and Learning

Guided by Prof. Pankaj Mudholkar

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Abstract– **Technology today has crossed all its restrictive barriers and has become a helping-hand to all the people of different walks of life. Artificial Intelligence has become a new wave of the growing technology in the world. Not only artificial intelligence has helped in creating amazing robots, but also it has paved its way to teaching and learning. This paper aims to highlight the importance and emergence of using artificial intelligence in today's education system. How the effective applications of artificial intelligence affect the current teaching and learning and why it is more effective than the current technologies used for teaching in schools is all explained here.**

Keywords—Artificial intelligence, augmentation or augmented reality, higher education, machine learning, teaching, teacher bots.

I. INTRODUCTION

Higher education today makes an intensive use of innovative technologies for learning and teaching and makes use of advanced computer systems to make learning and teaching easier for the students as well as their teachers. Recent developments in artificial intelligence have provided new challenges and opportunities to the people in the educational world; rather, artificial intelligence has the pure potential in changing the dimensions of the current methods in teaching and learning of the higher education system. Though being an epitome of the advancement in technologies, there is still no clear definition of "what is an artificial intelligence?" The thirst to investigate artificial intelligence solutions had begun in 1950s. The very first solution was to infer that "when to consider a system intelligent?"

Scientists like Turing (Russell and Norvig, 2010) had proposed a solution. He had stimulated a game where the player has to make out the differences in the ways of communication with a machine and a human being. If the player is unsuccessful in pointing out the difference between both, then the artificial intelligence has been achieved or accomplished. In 1956, John McCarthy offered the most comprehensive definitions of artificial intelligence, "AI is the basis of the assumption that every aspect of learning or any other feature of intelligence can be described precisely the property of machine or program; the intelligence that the system demonstrates." (Kerr, 2017)

Most approaches only put emphasis on cognition when it comes to the definitions and applications of artificial intelligence (AI), and disregard any political, philosophical and psychological aspects. The basic definition of artificial intelligence (AI) is purely dependent on the revision of past studies (Dacre Pool & Qualter, 2012). The basic definition or meaning of artificial intelligence (AI) is those computing systems that work on complex non-numeric algorithms, those systems which are involved in human-like learning, adapting, making fast decisions, synthesizing and self-correction and lastly, use of data for computing complex tasks.

Artificial intelligence is already being applied in several higher education institutes or universities. For instance, Deakin University in Australia has already implemented IBM's supercomputer, Watson as an emerging form of artificial intelligence as a solution for teaching to students. The Watson also manages to provide course guidance and advice to the students (Moles and Wishart, 2016). This superb innovation significantly made huge and great modification in the quality of service, workforce and dynamic time within the university. However, point to be noted: "machine learning" is a relatively growing research in the field of artificial intelligence. Few of the artificial intelligence solutions are based on passive programming, while other solutions are based on making predictions and self-learning patterns. In this research, 'machine learning' is included in artificial intelligence (Schölkopf, 2015). Machine learning is a software that can make predictions, identify patterns and try to implement those newly discovered patterns to the circumstances that were not covered by the primary design.

The current research study's aim is to observe and analyze the applications of artificial intelligence in teaching and learning. This conceptual research paper combines articles according to the concepts and themes of integration of AI in education. It highlights the current 'understanding' of applying AI in the ongoing education systems. Not only there are advantages of AI in education, but also there are many challenges to be faced while integrating AI in education. This paper provides a snapshot of future role of AI in education system.

II. THE DEVELOPMENT OF ARTIFICIAL INTELLIGENCE IN EDUCATION

Artificial intelligence is often described as tools or instruments that are extensively used in different cities and campuses all over the world. AI includes common technologies like smart phones, internet, search engines, various apps, and household appliances. The most common artificial intelligence experienced by almost everyone, every single day is a highly complex set of software, iPhone's Siri (Shulman & Bostrom, 2012). Although it is considered as an AI with very low complexity, it still has been labeled as an

AI project by the USA since 2001. In 2007, this AI was implemented in iPhone operating system. Nowadays, AI is used by Google for its search engines. Moreover, AI has moved on in the direction of automobile services, the recent example being, self-driving cars (Hillier, 2015).

Human-AI interaction is considered as the best solution that assists the disabled people around the world. Hence, these technologies can inspire people to establish the collaboration of AI and higher education. It may enhance the engagement of teachers and students in learning and teaching. In his Encyclopedia of Science, Technology and Ethics, (Kelley et al., 2016) describes cyborg as "a crossbreed of a human and a machine". Based on (Programas de las Naciones Unidas para el Desarrollo, 2015), computing systems that use complex non-numeric algorithms are being helpful to the people with different kind of abilities. Moreover, to certain degree, these machines are more involved in some human-like processes, and they can do way more complicated tasks in the world of teaching and learning. Thus, a new era for higher education is now open for institutions.

This kind of unique interaction between the machines and humans is steadily becoming a turning point to help humans learn and memorize things. However, the main question still remains unsolved, that how long will it take for the AI to increase the memory and cognitive skills among human beings. According to few MIT scholars, there shall be some changes in technologies, mostly after 2007, which reflected into reality when the first models of iPhone came into the markets. Not only iPhone is a new technology that assists us to access and use information that was not possible a few years ago, but also it causes an influential cultural shift that influences the individuals' social lives (Liebowitz, 2001). 'Cross-breeds' or cyborgs of human and machines can be manifested in the world of education in the near future, if emphasis of "cyborgs" from science-fiction to computer application for both teachers and students.

The effect AI has on economy has gained attention of numerous analysts. It has been estimated that, in 2014, Google had the largest investment ($400 million) in the acquisition of Deep Mind Technologies, in the European Union. Recently, Deep Mind Technologies as Google DeepMind has been taken into consideration as a start-up of London-based artificial intelligence, which can be used in machine-learning. Remarkably, Google had made another investment on artificial intelligence in the German Research Centre (Lanctot et al., 2017). According to the report by their website, this research centre was the leading research centre in the whole world on Artificial Intelligence and its application (Avramidis, Popović, & Burchardt, 2015).

Artificial intelligence is a field that is competed by some great giants of technologies like Google, Apple, Microsoft and Facebook, and they invest a lot in application and research in AI. Based on a report by Google in December 2015, a new model of computer called D-Wave 2X is able to compute complex operations like that of AI (Caplar, Tacchella, & Birrer, 2017). This model of computer is way faster than the current computers. To Google researchers, it is a giant leap and significant breakthrough in the field of AI. "We hope it helps researchers construct more efficient and more accurate models for everything from speech recognition, to web search, and protein folding" (Elsayed, Thomas, Marriott, Piantadosi, & Smith, 2015).

Investment on AI can have a huge influence on academic settings. As in aforementioned examples, the combination of machine and human brain is feasible, and this issue poses a challenge for the teachers to look for different dimensions, functions, and pedagogies in many different contexts for teaching and learning. By taking methods of analysis and brain signals with some different approaches in new computing systems, the computer professionals have provided us with some solutions to manage the software with an interface of a brain and a computer (Kena et al., 2015). Brain-computer interface can take up a computer activity and decode it. Plus, it makes the communication easier among those who are disabled due to motor functions (Pandarinath et al., 2017). Our abilities and skills have enhanced by quick expansion of technology to use AI functions. As Schleicher pointed out, "Innovation in education is not just a matter of putting more technology into more classrooms; it is about changing approaches to teaching so that students acquire the skills they need to thrive in competitive global economies"(Schleicher, 2012).

Different AI techniques have been used in adaptive educational systems. These techniques are often referred to as Fuzzy Logic, Neural Networks, Decision Trees, Bayesian Networks, Hidden Markov Models, Genetic Algorithms. However, there is no standard approach to apply the technique of AI to some particular learning method. What is basically required in the educational systems is a tool that is easily configurable and accessible in various learning environments, such as traditional or eLearning.

In education system, the educational goals can be fulfilled and managed with the help of AI. By using AI, the teachers shall be able to analyse the learning pace of each and every student in a particular topic. Furthermore, the AI has the ability to tailor the course according to the students' learning capabilities. Moreover, AI can help tutors in the terms of homework. The most recent example is Coursera, which acts like an enormous open online course provider, analyse and evaluate students' responses to a problem. Coursera found out that many students had submitted incorrect homework. Accordingly, the teacher is alerted through the system and the system itself gives away clues to the right answer to the prospective learners. In this paper we have only a few tools and techniques that shall shape the application of AI in educational context in the near future.

A. *Artificial intelligence can automate grading in educational context.*

AI grading systems can be implemented in fill-in-the-blanks questions and various MCQs, sparing enough amount of time for the teachers to interact with students and prepare for the next lecture.

B. *Students could receive supplementary help from AI tutors*

Though there are some subjects that cannot be taught by AI the way actual teachers can, there are few AI programs that can help with basic problems in few subjects like maths and sciences.

These AI programs can instruct students only basics subjects; however, these machines aren't perfect to tech high-order thinking and creativity to students. With the

rapid advancement of technology, advanced tutoring systems might not be an unattainable dream.

C. *AI programs can give constructive feedbacks to students and lecturers*

AI has the ability to give feedback to lecturers and students about the success of the course.

D. *AI can alter the role of teachers*

AI can act as a substitute teacher who can provide knowledge to students, ask questions, solve the doubts and take class tests.

E. *AI makes the process of trial-and-error learning less daunting*

AI systems have been designed to assist students in the process of learning, in this context, trial and error process is much less intimidating to students. Since AI systems provide students with fairly judgment-free environment of learning, moreover, as AI tutors can suggest solutions to
students' performance. Indeed, AI is considered as an optimum system for learning, because AI itself frequently learn through a trial-and-error method.

AI systems provide this level of insight to not only save time, but also can provide teachers with more details which may not be obvious or possible for teachers to identify them. Classroom AI systems have a high capability to analyse multiple sources of data and compare those data to known patterns. They can recognize the source for problems and also give guidance to lecturers to achieve more consistent outcomes across various classes.

III. Challenges of Artificial Intelligence Solutions

There are many challenges that we shall deal while implementing AI in educational systems:

Cost: Initial outlays of software and cloud support can be very expensive for certain educational systems. The on-going training of AI system would be expensive if organizational processes change.

Culture clash: The organizations may have considered many changes as suspicious. Due to several options available to implement technology in learning and teaching which are highly cost-effective than AI, it may be looked down upon several investors.

One lesson that deserves attention is MOOC. In 2008, MOOCs were used for the first time, after that time we heard about changes that came over the higher education. The outcomes of research on this issue revealed the failure of MOOCs to meet the participants' promises. However, an important issue refers to some irrational and unreserved ideas surrounded MOOCs when the decision-makers failed to consider the key principles like evidence-based arguments or academic skepticism. Moreover, they were not interested in learning and they were just thinking about the financial profits (Popenici, 2013).

A recent development in non-invasive brain-computer interfaces made us all reconsider about the role of teachers, or they did their best to replace teacher-robots or teacher-bots (Hayes,2015). Recent super-computers like IBM Watson are capable of recording the presence of teachers in the classrooms the whole semester. The structure of education system can take a sharp turn if AI takes the entire control of teaching and learning.

IV. Result and Discussion

Although, AI solutions may have a huge impact in the educational system in the future, it may have many challenges. To Perez (2016), AI solutions can do all tasks automatically. The current paper does show a few evidences of applying AI technologies for enhancing teaching and learning. However, we do have some limitations; AI cannot replace a teacher, completely. Applying AI technology in education system comes with its own opportunities and risks. This issue needs both attention and analysis from the point of view of academics. The motive for AI is like a panacea in higher learning and leaves those who are in the path under the wheels of reality. However, an important issue in education is maintaining academic skepticism. Generally speaking, we need to consider this aim to nurture responsible citizens and educated minds.

V. Conclusion

Increasing the application of AI is not the reason to disregard the profound debate about the role of teaching and learning in education. The advancement of technology and job displacement admitted extensively, however, it indicates that teachers' role should be reconsidered for teaching in education. Taking advantage of AI or IT solutions to recognize plagiarism can raise this question that who is responsible for teaching and learning. In addition, because of complex algorithms that can transfer their own biases in operating systems, AI software has the potential to replace a range of tasks, which are at the center of teaching practice in higher education (Rajasingham, 2009).

Nowadays, the models of pedagogies and their relations with AI are rethought by universities. Moreover, institutions of higher education can anticipate the possibilities and challenges that was a chance to accept artificial intelligence in teaching and learning (Drigas & Ioannidou, 2013). These solutions make opportunities for teaching and learning, while supporting learning can keep the wholeness of central values and the aim of higher education. Finally, there is a requirement for conducting research on the applications and improvement of artificial intelligence and the possibility of increasing the human knowledge. Finally, it is essential to concentrate on the new role, the teachers play on new learning by the students, insisting on some factors like creativity, imagination, innovation and skills which can scarcely be performed by machines.

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Plastic and Thermocol Waste Management

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Abstract– **The use of Plastic has become a very essential material in our day to day life and plays a vital role in human comfort. But due to the non-biodegradable property of plastic, it has become a major pollution concern throughout the world. In this paper the problems associated with plastic material, their impact on environment and the alternatives of plastic derivatives were discussed. This paper will be helpful to spread awareness about plastic pollution.**

Keywords— non-biodegradable, derivatives

I. INTRODUCTION

Humans are heavily dependent on plastic and all its derivatives. Plastic and its' associated derivatives have become an inseparable part of modern life. However, the question is how much we are safe? Can we imagine a world without plastic? Can we think of a world where we can design, develop and use alternatives to plastics such as paper, jute, bagasse, cotton, recyclable materials.

II. PROBLEMS RELATED TO PLASTIC AND THERMACOLS

Plastic is a versatile material but it lacks proper degradation techniques. Maintaining the Integrity of the Specifications. Plastic chokes global environmental resources leading to major setbacks in maintaining the pristine character of natural resources across the globe; seas and oceans, wetlands, forests, deserts and grasslands.

It is one of the principal polluting material for large cities leading to complete damage of waterways and drainage networks. One of the brilliant examples from India is that of Mumbai; the commercial capital of the country. Plastic and its' derivatives also contribute to groundwater pollution and blocks under surface water networks thus contaminating drinking water sources. Environmental health and disease is negatively affected due to plastic menace. It is a high time we must search for potential alternatives all form of plastic and associated derivatives.

Thermocol sheets are injurious to health and have associated side effects. Mr. Rama Chandra, Chairman of the Karnataka State Pollution Control Board (KSPCB), agreed and said that thermocol is the biggest threat to solid waste handling, as it cannot be recycled.

Comparatively, thermocol is ecologically more dangerous than plastic, but for the quantity in circulation. People might be affected by bacterial infection, skin allergies and gastrointestinal problems.

The hazardous chemicals emitted from the material after burning can damage the ozone layer. Several countries have already stated that thin plastic bags should be banned immediately. Fortunately, some states also see the seriousness of this problem. Maharashtra has imposed 100% ban on plastic.

III. RECOMMENDATIONS

Using eco-friendly alternatives to plastic might reduce the problem associated with polythene and all its derivatives. Using alternatives such as sal plates, paper plates, cloth bags, jute bags has no such problems. These eco-friendly alternatives will improve small scale industries and MSME. A group of people can able to earn monthly up to 5000 rupees by collecting and stitching them with tiny wooden sticks. In India making sal thali is a traditional economic activity of rural areas especially in states of Eastern and Central India such as Bihar, Jharkhand, Chhattisgarh, Odisha and Madhya Pradesh.

It is sold at Rs 20- 30 per hundred in markets. Value addition of sal leaves are main livelihood activity of rural areas of West Bengal, U.P, A.P, Jhar khand and Odissa. Collection of sal leaf is generally done by women and children of forest fringe communities. These people have no land for cultivation or grazing animals. There is an urgent need to develop these rural based industries for strengthening of village economy. There is a necessity to establish market linkages for these small scale industries across India. This would further encourage rural entrepreneurship leading to decrease in migration trends.

Forest based livelihood opportunities would encourage establishment of forest plantations on a large scale. This would have a positive impact on large scale afforestation under Green India Mission. Forests being the carbon source and sink act as major carbon pools on earth's surface. Mega forest plantations contribute to the micro environment as well leading to better weather parameters such as increased rainfall, decrease in droughts, refilling of forest reservoirs and contributes to the holistic development of biodiversity of a specific region.

Jute bags can act as potential alternatives to plastic bags. Jute is biodegradable and 100% compostable. Jute (Corchorus capsularis and Corchorus olitorius), is lignocellulosic, bast fibre plant next to cotton in importance. Jute is a natural vegetable fibre made from the outer stem and skin of the jute plant. It is also known as 'the golden fibre' due to its shiny golden colour and financial worth. Jute

has a very low ecological footprint and contributes effectively to sequester carbon. Through jute cultivation in 0.80 million hectare area, India may reduce about 12 million tonnes of carbon dioxide from atmosphere every year which can be valued at 1080 crores INR. Potential Jute agro ecosystems can also be utilized for development of CDM A/R (afforestation/reforestation) projects in our country thus contributing to reduction in greenhouse gas levels across a long term scenario.

IV. CONCLUSION

Plastic though considered as a wonder material has proved to be a real challenge in maintaining sustainable development indices. Complete and stepwise ban of plastic is mandatory across India and around the globe. Various socio-economic political issues need to be addressed in order to maintain viability of the burning problem across a changing timescale. However, the situation has more worsened in recent times. It is high time to search for eco-friendly alternatives such as cotton, jute and other forest based materials that would inturn help in sustainable forest management.

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Solid Waste Management: Practices and Challenges

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***Abstract*— The horrifying condition of and challenges in society's Solid waste Management (SWM) in urban India is the inspiration of the present research. Urbanization contributes enhanced solid waste (MSW) age and informal care of MSW debases the urban condition and puts the wellbeing in danger. In this paper, an attempt is made to assess the real parameters of MSW, likewise to a far-reaching survey of MSW age, its portrayal, accumulation, and treatment choices as done in India. The present status of MSWM in Indian states furthermore, vital urban areas of India are additionally revealed. The fundamental conditions for tackling ideal advantages from the potential outcomes for open private organization and difficulties thereof and unnoticeable job of cloth pickers are additionally talked about. The investigation reasons that establishment of decentralized strong waste preparing units in metropolitan urban communities/towns and advancement of formal reusing industry segment is the need of great importance in creating nations like India.**

Keywords*— *Solid Waste Management (SWM), Union Territories (UT), Central Pollution Control Board (CPCB), National Engineering & Environmental Research Institute (NEERI).

I. INTRODUCTION

India is quickly moving from agriculture-based country to industrial situated nation. Around 31.2% population is presently living in urban territories. More than 377 million urban individuals are living in 7,935 towns/urban communities. India is a nation partitioned into 29 States and 7 Union Territories (UTs). There are three urban communities—Greater Mumbai, Delhi, and Kolkata—having populace of in excess of 10 million, 53 urban communities have in excess of 1 million populace, and 415 urban areas having populace at least 100,000. India has distinctive geographic and climatic districts (tropical wet, tropical dry, subtropical damp atmosphere, and mountain atmosphere) and four seasons (winter, summer, stormy, and harvest time) and in like inhabitants living in these zones have distinctive utilization and waste generation pattern. Be that as it may, till date, no solid advances had been taken to break down local and geological particular wastage designs for these urban towns and analysts need to depend on the constrained information accessible dependent on the investigation led by Central Pollution Control Board (CPCB), New Delhi; National Engineering and Environmental Research Institute (NEERI), Nagpur; Central Institute of Plastics Engineering and Technology (CIPET), Chennai.

Civil solid waste administration (MSWM), a basic component towards supportable metropolitan improvement, includes separation, stocking, accumulation, migration, preparing, and disposal of waste to limit its unfavourable effect on the environment. Unmanaged MSW turns into a factor for proliferation of endless sicknesses.

In developed countries waste management is researched and financial and innovative advancements have started responsiveness of partners towards it. High populace development rates, quickly differing waste portrayal and age designs, developing urbanization and industrialization in creating nations are the vital purposes behind focusing towards MSWM as more territory is required to accommodate waste.

Every year, around 12 million tons of waste is produced in India from road clearing and construction, demolition and in the landfill destinations, it involves around 33% of aggregate MSW. In India, MSWM is administered by Municipal Solid Waste (Management and Handling) Rules, 2000 (MSWR) and execution of MSWR is a major worry of and urban nearby bodies (ULBs) the nation over.

Domestic Hazardous Waste (likewise called "family unit perilous waste") and dangerous waste include squander medication, e-squander, paints, synthetic concoctions, lights, fluorescent tubes, shower jars, manure and pesticide holders, batteries, and shoe clean.

MSW in India has rough 40– 60% compostable, 30– half idle waste and 10% to 30% recyclable. Examination completed by NEERI uncovers that in totality Indian waste comprises of Nitrogen content (0.64 ± 0.8) %, Phosphorus (0.67 ± 0.15) %, Potassium (0.68 ± 0.15) %, and C/N proportion (26 ± 5) %.

A. Composition and Characteristic of Indian Municipal Waste

Following significant classes of waste are by and large found in MSW of India:

- Biodegradable Waste: Food and kitchen squander, green waste (vegetables, blossoms, leaves, natural products) what's more, paper.

- Recyclable Material: Paper, glass, bottles, jars, metals, certain plastics, and so forth.
- Inert Waste Matter: C&D, earth, flotsam.
- Composite waste: Waste garments, Tetra packs, squander plastics, for example, toys.

II. Treatment and Disposal of Municipal Waste Management

India is confronting the lacking of assets or the specialized ability important to manage the transfer of metropolitan solid waste. The two driving inventive components of waste transfer being embraced in India incorporate fertilizing the soil (aerobic composting and vermin composting the soil) and waste-to-energy (WTE) (incineration, pelletisation, biomethanation). WTE ventures for transfer of MSW are a moderately new idea in India. In spite of the fact that these have been attempted and tried in created nations with positive outcomes, these are yet to get off the ground in India to a great extent due to the way that budgetary suitability and supportability are as yet being tried

A. Composting

The natural content of municipal strong waste (MSW) tends to disintegrate leading to different scents and smell issues. To guarantee a safe transfer of the MSW it is alluring to decrease its contamination potential and a few preparing strategies are proposed for this reason. Fertilizing the soil is the deterioration of natural issue by microorganism in warm damp, aerobic and anaerobic condition. Fertilizing the soil of MSW is, in this way, the most basic and practical innovation for treating the natural division of MSW. Treating the soil can be done in two different ways i.e., vigorously and anaerobically. Amid vigorous fertilizing the soil oxygen-consuming microorganisms oxidize natural mixes to Carbon dioxide, Nitrite, and Nitrate. Amid the anaerobic process, the anaerobic miniaturized scale living beings, while utilizing the supplements, separate the natural mixes through a procedure of decrease. An anaerobic procedure is a decrease procedure and the last item is subjected to some minor oxidation when connected to arrive.

B. Vermi-Composting

Vermi-Composting is a process for transforming natural waste into supplement rich soil as it is handled by worms. It can't generally be depicted as a kind of treating the soil, which is a warmth creating a process that would really murder worms; while Vermi-Composting ought to set up a domain in which worms can flourish and duplicate. The worms process natural waste discharging them as natural material rich, stable, and plant-accessible supplements that resemble fine-finished soil. Supplements in Vermi-Compost are frequently significantly higher than conventional garden compost.

C. Landfilling

Landfilling is the disposal of waste with various liners lastly with earth cover. It is likewise the most practical, particularly in creating nations where it regularly includes pitching decline into a melancholy or shut mining site. A landfill is an office which is intended for the protected transfer of strong squanders. The baseliners and the top Cover, of the landfill, are considered as the most basic parts. The entrance of Leachate into the dirt is the significant issue in landfills. Landfills deliver landfill gases and leachate which can hurt human and natural systems.

D. Bio-methanation

Bio-methanation is the procedure of transformation of organic matter to methane and excrement by microbial activity without air through a procedure called anaerobic absorption. The solid waste from agro-based enterprises have high organic and henceforth its treatment by the procedure of bio-methanation is most feasible as it produces valuable items like biogas and advanced fertilizer. Biogas comprises of methane and carbon dioxide and can be utilized as fuel or, by utilizing a generator it tends to be changed over to power nearby.

III. Challenges

A. Awareness about segregation

Environmental awareness and citizen's interest to separate at the source, door-to-door, and transfer in proper garbage bins. Awareness is a vital job in MSWM and increases the productivity of waste administration stream. It is the most basic stage in the entire procedure of MSWM, which helps in dealing with strong waste prompting better achievement. Nonetheless, in India, the present situation uncovers that there is no isolation of waste at the source which prompts different environmental issues and it turns out to be extremely hard to isolate garbage at the station or in landfill or treatment site. Likewise, because of the absence of coordination among the inhabitants and absence of arranged urban communities in India, the occupants throw rubbish inappropriately. Aside from this, the containers are not situated in the nearby region and the quantity of ULBs workers isn't sufficient according to the people living around there.

B. Characterization of municipal waste

India is a vast nation separated into the distinctive climatic zone, diverse food habits, and distinctive expectation for everyday comforts in this manner delivering misuse of various kinds. Till date, no extensive survey has been directed to cover all urban communities and towns of India to portray the waste created and arranged on landfill. The policy-makers depend on the restricted data accessible from a few places in this manner can't give suitable answers for the sort of waste delivered for a specific district.

C. Urbanization

With the populace development, a test to give sufficient framework in urban zone and new landfill site choice is imperative. A large portion of the landfills are running past

their ability in metropolitan urban communities. Lacking money related help to oblige waste administration issue bothers it. Because of money related crunch ULBs don't have satisfactory foundation to give reasonable arrangements.

D. *Appropriate technological advancements*

Environmentally friendly practices are the need of great importance to adapt to the relatively exponential development of MSW. For this, fitting innovative arrangements through PPP are required. Notwithstanding, the absence of competency and lacking monetary help are real dangers to ULBs for the advancement of MSW framework. There is a requirement for Public and Private Partnership to execute administration and taking care of with the most recent innovation/know-how with the subject experts' firms and organizations. Foundation of the great open administration consistent with anchored administrative structure and best money related help and strict contract execution is required for the accomplishment of PPP. Limit building and accessibility of gifted work, nature with new and additionally best practices accessible for SWM, money related impetuses for distinguishing new techno-attainable arrangements, fitting and snappy choice at ULBs level for smooth execution are genuine difficulties

IV. SOLID WASTE MANAGEMENT PRACTICES AND CHALLENGES IN INDIA

In India, MSWM is represented by MSWR. Be that as it may, a larger part of ULBs don't have proper activity gets ready for execution and order of the MSWR. Shockingly, no city in India can guarantee 100% isolation of waste at harping unit and on a normal, just 70% waste gathering is watched, while the staying 30% is again stirred up and lost in the urban condition. Out of adding up to squander gathered, just 12.45% waste is logically handled and rest is discarded in open dumps. Existing and a future land necessary for the transfer of MSW alongside the development in populace and MSW age has appeared. Condition neighborliness, cost-adequacy, and agreeableness to the nearby network are real credits to accomplish effective strong waste administration framework. Basic examination of imperative parameters of MSWM rehearse as for Indian Scenario is outlined underneath:

A. *Segregation*

There is no logically arranging isolation of MSW either at a household unit level or at a community bin. Arranging of waste, is for the most part achieved by disorderly division and only from time to time honed by waste makers. Isolation and arranging takes puts under extremely perilous and risky conditions and the adequacy of isolation is sensibly low as disorderly segment isolates just important disposed of constituents from waste stream which can promise them nearly higher monetary return in the reusing market. On various events, because of ill-advised dealing with the isolated constituents got stirred up again amid transportation and transfer. An absence of isolation denies a legitimate logical transfer of waste.

B. *Collection*

Squander created by houses is normally moved into shared bins that are manufactured from metal, produced using concrete or in a mix of both. Road sweepings likewise discover its approach to the same bins. These people group squander containers are additionally utilized by other fundamental business segments in the region of transfer canisters alongside family unit squander with the exception of where some business edifices or modern units draw in city experts for exchange of their loss to the transfer site by paying some sum.

C. *Recycle/Reuse*

This involves exercises like gathering those materials from the waste, which could be productively recovered and used for making new items. Since un-segregated waste is dumped at containers, its ideal reusing isn't conceivable. Be that as it may, cloth pickers generally dealt with and took and offer recyclable material like plastics, glass, and so forth.

D. *Transportation*

Methods of transportation for MSWM honed in India are bullock trucks, hand rickshaws, compactors, trucks, tractor, trailers, and dumpers. In littler towns trucks having 5– 9 ton limit are utilized without a sufficient cover framework. Stationary compactors, portable compactors/shut beats, and canvas canvassed vehicles are utilized in the transportation of MSW and around 65, 15, and 20% of waste is transported through these compacters, individually. The upkeep of vehicles utilized in for transportation of waste is normally done in a workshop kept running by ULBs however the vast majority of these workshops can do minor repairs as it were. No big surprise, in case of a breakdown of these vehicles, the general accumulation, transportation, and transfer proficiency decreases radically. Just couple of exchange stations can be found in some metropolitan e.g. Mumbai.

V. CONCLUSION

In this paper, an attempt has been made to think about the changing patterns of amount and qualities of MSW. The changing example of waste arrangement underscores the significance of isolation for effective task of waste administration offices. Metropolitan experts ought to keep up the storage conditions in such a way, to the point that they don't make unhygienic and unsanitary conditions. Another overview ought to be completed on the age and portrayal of MSW in India. Since the MSW is heterogeneous in nature, a substantial number of tests must be gathered and broke down to get factually dependable outcomes.

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Use of IoT in Sewage Treatment Plants

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Abstract– **Urbanization in our country is occurring at a breakneck speed, and hence there has been an equivalent increase in the need for and the use of water. As we all know, water is one of life's most essential necessities. Studies show that, almost 80 percent of the water that is supplied for domestic use, comes out as wastewater. In many instances wastewater is let out untreated. Due to this it either sinks into the ground as a potential pollutant of ground water or is led into the sea body through pipelines. The organizations that operate wastewater management processes have long been dependent upon Supervisory Control and Data Acquisition (SCADA) systems. These systems monitor water processing and redistribution systems. And yet the practical limitation of SCADA's installation points has restricted its use. This paper displays how to leverage IoT to solve waste water management problems.**

Keywords— ***SCDA, IoT, Water Waste Management***

I. INTRODUCTION

Water is without any doubt one of the most precious natural resources. With rapid urbanization, the resource is naturally becoming scarce quickly. As stated by IoT researchers, "The number of connected devices will grow by two billion objects in 2006 to a projected 200 billion by 2020."IoT in water treatment uses the concept of smart sensors that are installed at various points in the water system. These sensors can efficiently collect data and send it back to the monitoring systems. This data could include temperature changes, water quality, pressure changes, water leak detection, and many such problems. [1]

Fig.1. Waste Water Collection technique

II. PROCESS OF SEWAGE TREATMENT

Wastewater treatment is the process that involves cleaning sewage which enters the waste water treatment plant (WWTP) from various sources. This WWTP takes in sewage, which often consist of wet waste from processes from restaurants or factories. After the main solids get settle out of the sewage, the general treatment process that includes usage of bacteria that 'eat' the sewage and separate it into clean water and solid sludge. To carry out this treatment process we need energy, oxygen, and chemicals. The oxygen helps in aerating the sewage and activates the bacteria; and the chemicals help in removing the pollutants from the water. IoT technology helps in enabling organizations to implement sensors, optimize algorithms and simulate models to better understand the plant's state and how it impacts the plant's need for oxygen, energy, and chemicals. [2]

Sewage processing plants consists of three main parts: a liquid line, a sludge line, and a gas line. Firstly, the sewage is cleaned in the liquid line. Then the clean water is taken to the nearest lake or river, and the solid matter is disposed in to the sludge line for additional treatment. The sludge line's functionality produces water that is sent to the liquid line again for additional treatment. The sludge that is loaded on the tracks and taken away from the plant and methane gas that is used in the gas line as a source for self-produced electricity. The plant treats water to the level required by the regulator, while keeping expenses as low as possible. This is mainly done by controlling the concentration of oxygen in the reactor, adjusting various pump rates, and adding chemicals.

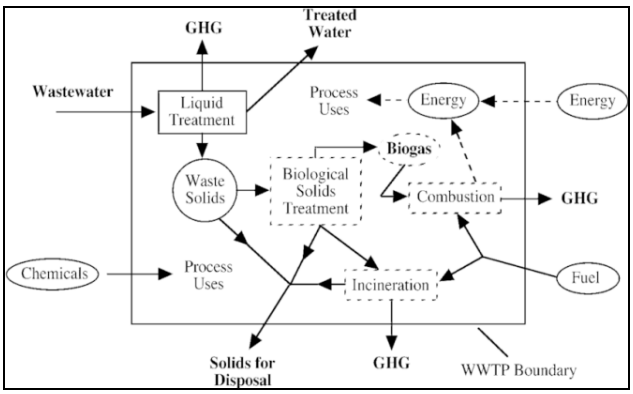

Fig.2.Process of Sewage Treatment Plant

III. Using IoT to Optimize the Process of Sewage Treatment

A. Conserving Resources

For WWTPs, there are challenges in treating water due to the dynamic nature of the operations. For instance, there are different volumes of water that come in at different times of day or night. Moreover, when weather is cold, the bacteria used to break down the wastewater behave in a different manner. Electricity rates can also vary at different times of day or night. IoT can thus help in optimizing various systems that have the potential to change how we deal a WWTP. With information coming in from so many sensors, IoT helps in providing more insight into how we use our world's resources and how we can conserve them in a way that makes sense. [3]

Fig.3.Waste water Treatment.

B. Providing Reliable Communication

IoT in water treatment provides reliable communication technology that is used to send data from physical objects over a wireless channel to a computer with smart analyzing software. Organizations can make use of smart phones and tablets can have apps that connect to the cloud or be integrated with an EAM CMMS system. This helps in accessing the IoT sensor data in real-time. With this technology, organizations can help technicians, engineers, and other facility management staff to get insights wherever they are or places engineers typically can't reach.

Fig.4 .Wastewater Treatment and Monitoring

C. Tracking Leaks and Residues

An IoT enabled smart water sensor can help in tracking quality, pressure, and temperature of water. In fact, a sensor solution can allow organizations to measure liquid flow and thereby, can be used by a water utility company to track the flow across the whole treatment plant. Engineers can access this data, interpret the data, and make suggestions and send to the facility manager.

IoT can help in detecting leaks and send an immediate alert to a remote dashboard. These notifications are immediately noted where as if an engineer had to check the levels by hand or on foot it could take hours for a problem to be detected. This allows the engineer to address the issue faster, find a solution, and thus moves on to the next task.

Another huge benefit to IoT in wastewater management is the detection of residual chemicals that remain after treatment. This can be used to calculate the efficacy of the selected treatment process and ensure the release of chemicals stays within permissible limits. [4]

Fig.5 .Smart Water Sensor.

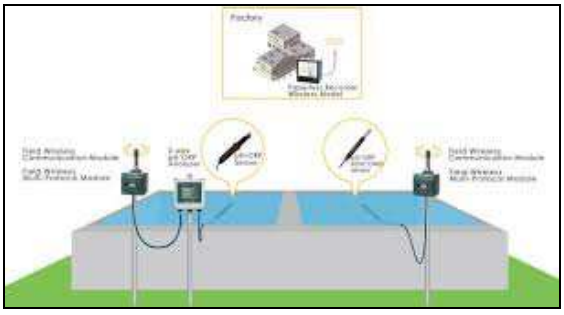

Fig.6 .Wireless Monitoring of Waste Water

IV. CONCLUSION

From the above information we can determine that IoT has many benefits in sewage water treatment industry. It can help in increasing staff productivity, keeping them out of harm's way, and reducing unnecessary costs for facility. Hence, it is important to upgrade corporate infrastructure of sewage water treatment plants with IoT.

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The 3R's of Managing Solid Waste: Reduce, Reuse and Recycle

Guided by Prof. Sonam Pareekh

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***Abstract*– The objectives of writing this paper is to study the current practices related to the various waste management initiatives taken in India for human wellbeing. The other purpose is to provide some suggestions and recommendations to improve the waste management practices in Indian towns. Existing reports related to waste management and recommendations of planners/NGOs/consultants/government accountability agencies/key industry experts/ for improving the system are studied. This work is original and could be further extended.**

Keywords –***India, Recycling, Waste Disposal, Waste Management***

I.INTRODUCTION

"There are few things certain in life – one is death, second is change and the other is waste." No one can stop these things to take place in our lives. But with better management we can prepare ourselves. Here we will talk about waste and waste management. Each of us has a right to clean air, water and food. This right can be fulfilled by maintaining a clear and healthy environment. Now for the first question, what is waste? Any material which is not needed by the owner, producer or processor is waste. Generally, waste is defined as at the end of the product life cycle and is disposed of in landfills. Most businesses define waste as "anything that does not create value" (BSR, 2010). The annual quantity of solid waste generated in Indian cities has increased from six million tons in 1947 to 48 million tons in 1997 with an annual growth rate of 4.25 percent, and it is expected to increase to 300 million tons by 2,047 (CPCB, 1998). Population explosion, coupled with improved life style of people, results in increased generation of solid wastes in urban as well as rural areas of the country. In India like all other sectors there is a marked distinction between the solid waste from urban & rural areas. Due to ever-increasing urbanization, fast adoption of 'use & throw concept'& equally fast communication between urban & rural areas the gap between the two is diminishing. The solid waste from rural areas is more of a biodegradable nature & the same from urban areas contains more non-biodegradable components like plastics & packaging.

It focuses on current practices related to waste management initiatives taken by India. It also highlights some initiatives taken by the US federal government, states and industry groups. The purpose of this paper is to gain knowledge about various initiatives in both countries and locate the scope for improvement in the management of waste.

II.PRESENT STATUS OF SOLID WASTE GENERATION

Present condition of the solid waste generation can be described in different point of views. The generation and management of solid wastes are described in World and Bangladesh perspective. Following are the different types of waste.

Domestic waste, Factory waste, Waste from oil factory, E-waste, Construction waste, Agricultural waste, Food processing waste, Bio-medical waste, Nuclear waste, Slaughter house waste etc. Solid waste- vegetable waste, kitchen waste, household waste etc. E-waste- discarded electronic devices such as computer, TV, music systems etc.

Plastic waste- plastic bags, bottles, bucket, etc. Metal waste- unused metal sheet, metal scraps etc. Nuclear waste- unused materials from nuclear power plants Further we can group all these types of waste into wet waste (Biodegradable) and dry waste (Non Biodegradable). There are common practices to dispose waste from ordinary people. But disposal of waste is becoming a serious and vexing problem for any human habitation all over the world. Disposing solid waste out of sight. Following is the categorization:

A) Wet waste (Biodegradable)

- Sanitary wastes
- Green waste from vegetable & fruit vendors/shops
- Waste from food & tea stalls/shops etc.

B) Dry waste (Non-biodegradable)

- Cardboard and cartons
- Containers of all kinds excluding those containing hazardous material
- Packaging of all kinds
- Glass of all kinds
- Metals of all kinds
- Rags, rubber
- House sweeping (dust etc.)
- Ashes

Confederation of European Waste to Energy Plants (CEWEP) and European Environment Agency (EEA)

provides sound, independent information on the environment.

III. Waste Management System in India

Waste management market comprises of four segments - Municipal Waste, Industrial Waste, Bio- Medical Waste and Electronic Waste Market. All these four types of waste are governed by different laws and policies as is the nature of the waste. In India waste management practice depend upon actual waste generation, primary storage, primary collection, secondary collection and transportation, recycling activity, Treatment and disposal. In India, municipality corporations play very important role in waste management in each city along with public health department. Primarily by the city municipality:

1. No gradation of waste product eg bio-degradable, glasses, poly bags, paper shreds etc.
2. Dumps these wastes to the city outskirts
3. Local raddiwala / kabadiwala (Rag pickers)
4. Collecting small iron pieces by magnets.
5. Recycle – Keep things which can be recycled to be given to rag pickers or
6. Waste pickers.

(Kabadiwallahs).Convert the recyclable garbage into manures or other useful products

IV. Waste Collection in India

No gradation of waste product eg. bio-degradable, glasses, poly bags, paper shreds etcDumps these wastes to the city outskirts Local raddiwala / kabadiwala (Rag pickers) collecting small iron pieces by magnets.

V. challenges in India

Key issues and challenges include lack of collection and segregation at source, scarcity of land, dumping of e-waste, lack of awareness, etc. Simple dumping of mixed waste is the practice followed practically everywhere and especially in the developing countries as they cannot mobilize financial resources for applying expensive technology propounded by the developed countries.

VI. Suggestions for future improvement

The political will is the first priority. Generally Government bodies and municipalities give priority to present problems which they face but do not think for future problems due to environmental decay. Their view is that, they will solve problems when they will face it but not

VI. Conclusion

It is suffice to say that we require a more stringent integrated and strategic waste prevention framework to effectively address. During the recent past, the management of solid waste has received considerable attention from the Central and State Governments and local (municipal) authorities in India wastage related issues. There is an urgent need to build upon existing systems instead of attempting to replace them blindly with models from developed countries

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Usage of Instant Messaging Application on Smartphone's among youth

Guided by Prof. Pankaj Mudholkar

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Abstract– **The purpose of this paper is to explore why young people use and what motivates them to use Instant Messaging Applications (IM) applications on their digital devices with specific reference to WhatsApp.**

A qualitative and quantitative approach is employed in this paper with a view to explore the Uses & Gratifications of university youths and their expectations behind using such instant messaging applications. For qualitative approach in-depth interview of 7 students (4 girls, 3 boys) was employed through semi-structured, open-ended interview schedule whereas for quantitative approach survey of 150 students was conducted via questionnaire through purposive random sampling out of which 144 received back excluding those invalid not to be considered.

Broad understanding whether the expectations of Youths are The finding indicate that respondents are actively using WhatsApp for their Economic, Communication, Pastime, Diversion, Affection, Fashion, Sharing Problem and Sociability motives that leads to fulfillment of their expectations. Furthermore, the study consists of Fulfilled or not.

Keywords— Instant Messaging (IM) Applications, Smartphones, WhatsApp, Online Communication, Uses & Gratifications.

I. INTRODUCTION

Undoubtedly, smartphones are becoming central to our communication and information needs. The term smartphone refers to a programmable mobile phone that offers advanced capabilities and features that help individuals in their daily work and personal life. It contains functions such as instant messaging, downloading applications, utilizing information services as WiFi and global positioning system (GPS) and entertainment5 .

A smartphone ability to complement our lives is directly related to the richness and quality of its Mobile applications. In modern era smartphones have acquired the market so well that everybody now can interact, socialize, and can share ideas and information sitting at any corner in the world through an instant messaging applications like WhatsApp, Bbm, WeChat, Viber, Line, ChatOn, Hangouts, Skype, Windows Instant Messenger, GTalk, etc.

Instant messaging (IM) is a type of very popular and commonly seen communication services via the internet to enable people to create a private or group chat space.

According to Global Mobile Consumer Survey 2013 instant messaging catches up with SMS with 69% and 67%6 .An Instant Messaging applications can serve as a very useful and interactive way of communication which allow users to exchange instant messages in form of text, share videos, audios and images via smartphones instead of relying on desktops and laptops.

II. WHATSAPP AS AN ONLINE COMMUNICATION APPLICATION

Communication is the process of sending and receiving information . The transmission of information, ideas, emotions, skills, etc. by use of symbols-words, pictures, figures, graphs etc. it is the act or process of transmission that is usually called communication (Berelson and Steiner) . According to Oxford Dictionary the word “online” means controlled by or connected to a computer or to the internet14 . WhatsApp allow it users to send and receive messages in textual, image, video and audio notes forms via internet connectivity (2G, 3G and WiFi) as required for any other web browsing activity. Being connected it shows the status of “Online” and at disconnection it shows last seen moment of a WhatsApp user. So the application run through internet connectivity and fulfills all the basic elements of communication – sender (encoder), message, channel, receiver (Decoder), feedback and Noise. In the explanation below sender is a person using WhatsApp through his mobile device is free to send messages in Textual, Images, Audio and Video format through the Mobile/Digital device channel (WhatsApp) enables by data plan required for any type web surfing or browsing which connects the device to a network leading to the connectivity and at receiver end she/he can receive the message and can interpret the same and can make response which comprises feedback. In the whole process the sender and receiver acts as a participant who and whereas Noise is concerned can take place at any end. From the above discussion it is concluded Whatsapp as an Online Communication Application.

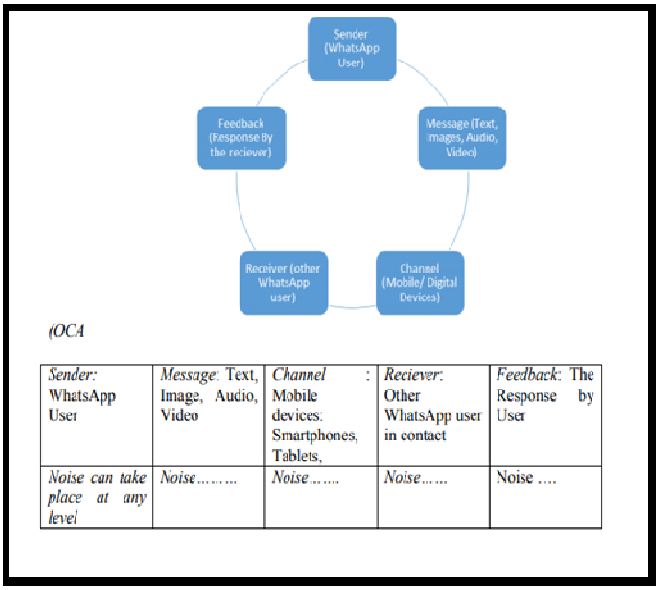

Fig.1. Online Communication Application

III. FINDINGS

Views were taken from the respondents with regards to the usage of Whatsapp. It was observed that the motives behind using WhatsApp on which respondents agreed upon following:

Sr. No.	Parameters
1	Cost Effective
2	User Friendly
3	Less Technical
4	Social Influence
5	Social Pressure (friends suggested to use)
6	Sharing Views of gossips all times
7	Maintaining Relationships
8	Better then SMS and sns
9	Feel relax while using it
10	Whole day usage cost few Mb only
11	Convenient to use
12	Informal Communication
13	Fluid Communication
14	Personal Communication
15	Takes away from whole day tensions

Table 1: Motives of using WhatsApp

IV. CONCLUSION

From the study carried by the researchers, the findings are not only interesting but somewhere shocking as it shows the shift from Social Networking Sites to Instant Messaging Applications (WhatsApp). According to the results, youth whether from Urban, Rural and sub urban area is using WhatsApp with their Smartphone devices.

More than 80% of the respondents are using WhatsApp on their Daily Basis 90% for maximum 0-1hr duration. Most of them like all the features WhatsApp along with Emoticons which attracts more than 50% to use while chatting.

The respondents were agree that the Economic, Communication, Passtime, Diversion, Affection, Fashion, Sharing Problem and Sociability factors along with sub-factors motivate them to use WhatsApp.

When it comes to maintaining relationships whether individual or social the 46% respondents it often and 55% stated it is improving their social relationships. Carrying forward WhatsApp is fulfilling youths expectation quite often (40%) as it helps them to communicate with friends, the hurdle comes with Internet surfing and absence of online friends which make them dissatisfied. For future perspective research related to comparison of Various Instant Messaging can be carried with huge sample size and in terms of Whatsapp research related to Feature comparison of WhatsApp before and after Facebook acquired will add wonders to Technology.

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Coconut Shell Treasure of India

Guided by Prof. Megha Mudholkar

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***Abstract*— the potential of coconut shell as a crop residue and its use as a bio fuel has been ignored by our local communities and researchers, despite its importance as an alternative fuel in homes and small-scale industries. Today due to the increasing demand and cost of petroleum energy caused by decreasing supply and cost of firewood as a result of deforestation, demand and increasing population, coconut shell as a valuable biofuel must be viewed with seriousness. When coconut shell is used as a fuel, this attempt to reduce the amount of CO2 in the atmosphere and sanitizes the environment of the injurious hard shell in addition to providing alternative and better source of fuel than fuel wood and other traditional fuel among the poor rural communities especially in developing countries. This reduces the demand and cost of fossil fuel as domestic energy. In this research, the potential of coconut shell was investigated by measuring a number of parameters ranging from moisture content, ash content, density and caloric value and specific heat capacity. Moisture content is considered as the most important parameter of the five parameters measured. The result of this research indicates a moisture content of approximately 9%, ash content 1.1%, density 0.98cm3, calorific value of 17.7mj/ kg and a fuel value index (FVI) of 810. Among all the agricultural crop resources namely, rice husk, sugarcane biomass, maize straw, rice straw, coconut frond and leaves, coconut shell has the highest biomass quality and the most utilized in ceit can be process din to charcoal due to highlignin content. Conclusively, considering the above measurement and results obtained from the coconut biomass as a biofuel, it is essential and necessary to encourage the use of coconut shell as a domestic fuel, particularly in the rural areas of developing countries where petroleum energy, deforestation and fuel wood scarcity is a challenge.**

Keywords— Coconut shell, Carbon dioxide, Biofuel, Sanitation, Deforestation.

I. INTRODUCTION

Bio fuel is a fuel obtained from biologically degradable materials, either from plants or animals .Bio fuel is of three types when processed and may be in the form of solid, liquid or gas. Solid biofuel is in the form of biomass obtained directly from farmland such as rice hull, coconut shell or corn stalk, or in the form of fuel wood. Malakini et al. (2014) reported that biomass; mainly firewood and charcoal contribute over 40% of Malawi's total energy demand.Other sources like electricity ,petroleum products, coal and other renewable energy sources play a minor role and account for only 7% of the energy use.

Solid biofuel may also be waste materials such as sawdust and rice hull which are processed into a briquette. Yahaya and Ibrahim reported that in most developing countries like Nigeria recycling of waste agricultural products like rice hull into useful products is rarely practiced; this results into pollution and blockage of drainages and waterways and heaps of refuse in streets causing floods and sometimes epidemic diseases. Bakker (2000) reported rice hull to have some disadvantage over other solid fuel such as high silica causing wearing in processing machines, high volatile matter, and ash than in wood, thereby causing a barrier for energy conversion (Jenkins, 1998). Its high ash, alkali and potassium content causes agglomeration fouling and melting in the components of combustion or boilers (Bakker, 2000). Klass(1998)suggested that the solution to solve barriers in energy conversion from rice husk is pretreatment through mechanical, physical and chemical means and bioprocessing. Tillman (2000) suggested combining rice hull with other fuels that are lower in alkali and chlorineis a step forward. Liquid biofuels are generated through a process known as fermentation to produce alcohol or oil from plants or animals which are esterified to produce a liquid fuel called biodiesel.

The gaseous biofuel is produced by a process known as methanation, where degradable materials are digested anaerobically to produce methane, which is a gas fuel.

This research intends to investigate coconut shells as a solid biofuel. Coconut is produced in 92 countries worldwide on about more than ten million hectares. Indonesia, Philippines, and India account for almost75 of world coconut production with Indonesia being the world's largest coconut producer.

A coconut plantation is analogous to energy crop plantation, however, coconut plantation is a source of a wide variety of products such as coir yarn for the weaving of coir mats, fiber mats, rugs, and carpets (Kürsten, 2015), organic fertilizer, animal feed, fuel additive for cleaner emissions and healthy drink etc.

The coconut fruit yield 40% coconut husk which contains 30% fiber, with dust making up the rest. The chemical components of coconut husk are of cellulose, lignin, pyroligneous acid, gas, charcoal, tar, tannin, and potassium. Coconut husk has higher lignin and cellulose content. The material contained in the casting of the husk and coconut fibers are resistant to bacteria and fungi.

Coconut husk and shells are an attractive biomass fuel and are also a good source of charcoal. The major advantage of using coconut is that it is a permanent crop and available

around the year so there is constant supply whole year. Activated carbon is manufactured from coconut shell which is regarded to be extremely effective for the removal of impurities in waste water treatment processes.

Coconut shell is an agricultural waste and available in large quantities through out tropical countries world wide, in many countries, coconut shell is subjected to open burning which contributes significantly to CO2 and methane emission.Tanetal.(2004)reported are duction in net CO 2 emissions are estimated at 77-104 g/mj of diesel displaced by biodiesel Coconut shell is widely used for making charcoal. The traditional pit-method of production has a charcoal yield of 25-30% of the dry weight of shells used. The charcoal produced by these methods affects the quality and is often contaminated with extraneous matter and soil. The smoke that evolves from the pit-method is not only a nuisance but also a health hazard. The coconut shell has a higher calorific value of 20.8mj/kg and can be used top roduce steam. Energy-rich gases ,bio-oil ,briquette, etc. are a good source of fuel particularly in rural areas where domestic fuel is achallenge.

It is to be noted that coconut shells and coconut husks are solid fuel and have the peculiarities and problems inherent in this kind of fuel. Coconut shells are more suitable for pyrolysis process as it contains lower ash content and high volatile matter content and available at a cheap cost. The highest fixed carbon content leads to the production of a high-quality solid residue which can be used as activated carbon in waste water treatment. Klass (1998) reported rice husk to contain about 30% -50% of organic carbon and a heat value of 13-16 Mj/kg. Coconut shell can be easily collected in places where coconut meat is traditionally used in food processing. Biofuel provides a solution to waste management by converting waste into usable energy.

Coconut husks have a high amount of lignin and cellulose and that is why it has a high calorific value of 3500-4000kcal/kg, Ash content 4%-5% and a moisture content of 15% (Yong et al., 2009). The chemical composition of coconut water consists of sugar, vitamins, minerals; amino acid and phytohormones (Yong et al., 2009), husks consist of, water-soluble 5.25%, pectin and related compounds 3.00%, hemicellulose 0.25%, lignin, 45.84%, cellulose43.44% an ash 2.22% (Young et al. 2009). The predominant use of coconut husks is in direct combustion in order to make charcoal; otherwise ,husks are simply thrown away and can be injurious but can be transformed into a value-added fuel source which can replace fuel wood and other traditional fuel sources. In terms of availability and costs of coconut husks, they have good potential for use in a power plant.

The leftover fiber from coconut oil, coconut milk production and coconut meal is used as live stock feed.The dried calyx is used as fuel in a wood-fired stoves Coconut water is traditionally used as growth supplement in plant tissue culture/micropropagation (Yong, et al.,2009).

Alejandro (2002) reported that the Philippine households tend to use several cooking methods for reasons of convenience and taste. Charcoal is a preferred fuel for grilling chicken and fresh fish and often used in the rainy season as a primary or supplementary cooking fuel in rural areas because of the problem of accessing dry fuel wood (Alejandro et al.,2002).

II. METHODOLOGY

Several parameters were examined on coconut shell biomass as a renewable source of energy. The parameters measured include:

A. Moisture Content

The moisture content of the coconut shell (husk)was determined as follows; 1000gms (1kg) of coconut biomass (husk and shell) was measured as an initial quantity using precision electric balance (model TL f00g). The initial quantity of 1000 g(1kg) of the coconut biomass was placed on a metal tray and put into a moment drying oven at a temperature of 1800C for six (6) hours to allow a loss in weight.

After six hours the sample was removed from the oven which was assumed to be dry by losing weight due to moisture (adhesive moisture). The dry coconut biomass was weighed again to determine the constant and final loss in weight (moisture content).

B. Percentage (%) ASH Content

The percentage of ash content (PAC) of the coconut shell was determined by heating 100 grams of the coconut biomass in a muffle furnace at a temperature of 200oc for six(6) hours ,adequate enough to allow burning. The burnt sample was allowed to cool, to observe the change in color and dust particle size. The sample weighing (100g) before burning was weighed using the electrical balance to determine the percentage quantity of ash.

C. Density

The density of a material is its mass per unit volume (mass/vol.). 100 grams of coconut biomass was measured to determine the mass using the electronic weighing machine. The density of the sample was calculated by dividing the mass (kg) by volume (cm3) of water or moisture displaced

Density=Mass (kg)/Vol. (cm^3)

D. Calorific Value(MJ/Kg^{-1})

The calorific value of coconut shells was determined using the percentage value of the ASH content and moisture content as suggested by Barnard (1985). The gross (higher) calorific value (HCV) or (HHV), which represents the amount of energy created when 1kg of absolutely dry wood is burned and all water created in the burning process is condensed. This was calculated through,

HCV =20.0 X (1-A-M) Mj/kg Where;

A = ASH content.

M = % moisture content.

The net (or lower) calorific value (L.C.V) which takes into account uncovered energy from the water vapors from inherent moisture and the oxidation of the hydrogen

content is sometimes used. The lower calorific value (LCV) was LCV= 18.7 X (I-A-M) -2.5xMjkg$^{-1.}$

E. Value Fuel Index

The Fuel Value Index (FVI) was calculated using the formula suggested by Bhattand To daria(1992)as follows: Fuel Value Index (FVI) = Calorific Value X Density/ASH

F. Specific Heat Capacity(JKG^{-1})

The coconut biomass ash content was used to determine the specific heat capacity using the mixture methods, bomb calorimeters (kj/Kg) was weighed out of the casing. It is then half-filled with water at room temperature (270c). The ash content was weighed and then placed in boiling water for about ten (10) minutes. The hot ash sample was quickly transferred into calori meter and stirred properly for the final temperature to be recorded and substituted into the equation. The equation was used for the calculation of the value on specific heat capacity.
The calculation was as follows by the formula:

$$\frac{(\text{Mass of specimen x } 460) + \text{mass of water } (0.4 \text{ x } 27\ ^{0}\text{c})}{\text{Mass of sample x temperature}}$$

III. Result and Discussions

In this result, the initial weight of 1000g produced a net weight of 912g ,a difference of 88 govern a period of six hours. This loss in moisture content was observed due to moisture content and possibly some volatile substances such as oil and tannins. The lost weight was equivalent to 8.8% of the total weight of tebio mass.

This moisture content was observed to be solely adhesive moisture content rather than surface moisture content.Amoisturecontentof8.8%/kg is low and adequate enough for a good fuel, a moisture content of 15% was obtained by (bioresource.com/coconut shell). This can be compared to wood which ranges from 20%-25% /kg and 2%-7% in wood and charcoal respectively. Torgrip& Fernández–Cano (2017) indicated a moisture content of 0.034%, 0.026% and 0.011%. The differences in moisture content obtained in coconut shell can be attributed to the humidity of the environment where the research was carried out, Olorunnisola (2007) reported that coconut husk is known for a high affinity for water (hygroscopic). Therefore, higher moisture content is experienced in the husk than the shell

In this ecological zone where the research was carried out ,coconut shell use as a biofuel is not popular and scarce compared to fuel wood which is the traditional domestic fuel. Therefore, coconut shell can serve as an economical and efficient domestic fuel for cooking and warming. This will reduce the effect of deforestation, carbon emission and the indiscriminate disposal of the injurious waste material.

A. ASH Content

The proportion of ash content was as low as 10g which represent about 1.09% indicating the coconut shell as a potential source of fuel. Mineral materials with low ash content were known to have high energy potential (JamesandDuke,1983)An ash content value of 0.0015,0015and0.0049 for three different fuel species on adry weight basis (Torgrip & Fernández–Cano, 2017).Ash comtent influences the choice of the appropriate combustion technique and deposit formation. High ash content enhances the cost of storage, handling, and disposal of waste. Also ,the ash content was observed to be odor less. The European Commission (2008) reported that the fuel nitrogen content is responsible for nitrous oxide formation emissions which belong to the main environmental impact factor of solid biofuel combustion. Anashcontentof0.7%to2.5%in some tropical wood was said to be normal .

B. Specific Heat Capacity

The specific heat capacity in this research indicates a value of 18.40mj/kg which can be compared to that of rice hull which is 13-16 mj/kg. This value is adequate enough to consider coconut shell as a fuel. This means it takes about 18.40 joules of heat to raise 1 kg of coconut shell as biofuel in the production of steam, energy-rich gases, bio-oil, and biochar. Given this potential from coconut shell, it is valuable as a source of cooking energy to refugee camps, especially in displaced conflict areas of Middle East Asia and Africa, especially where this research was carried out in Borno State Nigeria. This will go a long way in solving the internally displaced person's energy crisis.

C. Fuel Value Index (FVI)

This research obtained an FVI as follows: FVI = Calorific Value X Density/Ash, therefore: FVI=18.02 X 0.98/1.09 =17.66 FVI=17.66/1.09= 16.20
FVI=16.20 were estimated for 20gm of the fuel material, therefore for 1kg of the Coconut shell is equivalent to: FVI=16.20 X 50 =810
FVI=810
This value of 810 is adequate enough to conclude that coconut shell has a high energy value.

IV. Conclusion

In Nigeria, the Federal government through the Energy Commission of Nigeria (ECN) has put in place the following programmed scheme This research reveals that coconut shell has the basic values required of a good fuel, such as high caloric value, low moisture content, low ash ,low CO2,no offensive odor and low velocity on combustion compared to rice hull and wood. Memory et al. reported that the maximum and best

use of a biomass, like fuel wood depends on the type of stove or cooking appliance used. Therefore ,where coconut shell is utilized as a fuel it will command a higher price than the traditional fuel wood thereby saving the people's income in addition to CO2 free environment, reduced rate of deforestation and land degradation in Nigeria particularly in the Northern part of the country where the research was carried out. T Cetal.(2002)observed coconut shell charcoal to command a high price than wood in the Philippines very high energy value which is very important for domestic and even

significant for industrial purpose of promoting optimal utilization of renewable energy resources with the view of reducing deforestation associated with fuel wood sourcing.

V. CONCLUSION

In Nigeria, the Federal government through the Energy Commission of Nigeria (ECN) has put in place the following programmed scheme This research reveals that coconut shell has the basic values required of a good fuel, such as high caloric value, low moisture content, low ash ,low CO2,no offensive odor and low velocity on combustion compared to rice hull and wood. Memory et al. reported that the maximum and best

VI. RECOMMENDATIONS:

This research is, therefore, recommending Coconut shells as an alternative source of biofuel which is cheap and environmentally friendly as well as acceptable domestic fuel. This is also an economic means of safe disposal of coconut shells being injurious when stepped on with barefoot. A training programmed scheme on renewable energy technics and biomass utilization scheme is recommended.

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Waste Management Using Big Data Technology

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***Abstract*—our everyday data processing activities creates massive amount of data. In order to manager such a large amount of data is a tedious work to do. Thus, Big data can help companies to manage these data which can bring many benefits including waste management. It can also increase the recycling rates. Using big data with its great ability to deal with enormous amount of data the firms, organizations, companies etc can use the power of Analytics, reports and many more to help manage waste management. Grocers Can use Big Data, Analytics to Reduce Food Waste. In today's world where technology and IT are growing rapidly, and importance of data is increasing at each fraction of time, thus Big data can be a boon in this period of time.**

Keywords— Big Data, Analytic, optimize, Data Collection.

I. INTRODUCTION

Supermarkets and grocery stores are significant contributors to the 34 million tons of food waste in landfills that release harmful methane gas into the environment. Some of the many key elements that lead to the generation of this excessive food waste include consumers' demand for an abundance of fresh products, confusing sell by dates, damaged shipments of products and over-purchasing resulting in additional spoiled and non-purchased foods. It's a complex issue that involves complicated logistics, costs significant amounts of money and greatly impacts our environment.

Big information provides United States with info that permits United States to higher address business issues. When executives area unit authorized with period of time elaborated analytics, they will additional with efficiency benchmark their performance metrics, implement best practices and build company-wide changes to enhance potency and gain.

II. OPTIMIZING YOUR GARBAGE TRUCK

The multi-billion dollar residential waste management "industry" (both public and private entities) presents a substantial opportunity for innovation through the application of data-based solutions to collect waste more efficiently and improve utilization of waste collection resources. Significant, yet variable, resource inputs (trucks, labor, and fuel being most directly relevant) offer direct cost savings for municipalities or commercial entities able to gain efficiency in applying those resources. This segment is ripe for innovation for several reasons. Globally, urbanization continues to be a trend, with increasing populations living in ever closer proximity. The composition of waste continues to change between recyclables, compostable waste, and landfill waste. As such, resources for the collection, sorting, and disposal of solid waste continue to move towards increased categorization. Lastly, the waste management industry appears to be receptive to disruptive efforts, as evidenced by cities such as New York that are undertaking significant waste reduction measures.

III. SOLUTION

The Utilize existing data available from GPS and scale sensors on-board collection trucks to collect, analyze, and employ information regarding individual or street level solid waste production to more efficiently employ waste collection resources (trucks,labor, fuel, time, etc). Armed with an informed picture of the specific house, street, or neighborhood-level of solid waste production, which would become more informed over time with ongoing data collection, the public or private solid waste collection entity could then optimize its resource acquisition, retention, maintenance, and utilization. Each entity could optimize for route length, "truck-sized" routes (in pounds of waste), a specific shift length, distance traveled, cost, or other desirable optimums.

A. Data Collection

Modern collection trucks are currently equipped with on-board scales, GPS systems, and vehicle monitoring systems. The on-board scale is used primarily to help drivers comply with weight restrictions (e.g. small bridges and weight restricted roads) and avoid exceeding the vehicle weight rating. GPS data includes time and location and, in turn, speed and number stops. The on-board vehicle monitoring system provides fuel usage data, engine RPMs, and speed. Data from each of these sensors and systems could be downloaded from each truck periodically for analysis and incorporation. Any trucks lacking these features can be readily upgraded at a low cost. This data, merged in the appropriate way, could produce a data set which readily lends itself to powerful resource optimization algorithms.

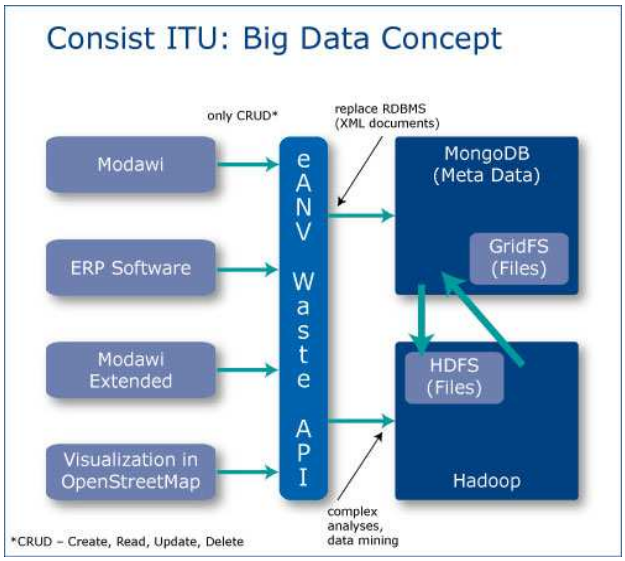
Exhibit 1: A theoretical example of one truck's weight over a work day. Increases in weight allow one to deduce the amount of waste collected at each stop. Merging this data with time-stamped GPS and operational truck data would allow one to deduce the amount of garbage

collected at the block, street, or even individual building . Merging this data with time-stamped GPS and operational truck data would allow one to deduce the amount of garbage collected at the block, street or even individual building level (contingent on scale accuracy).

IV. BIG DATA SOLUTION FROM CONSIST ITU

Consist ITU has based their Big Data solution on open source – the well-known MongoDB and the Hadoop ecosystem. Access is provided through our eANV-Waste API.

if the storage of the maximum amount info as attainable is in question, then it may be hold on within the intrinsicGridFS (FS=filesystem) of MongoDB. Access to the systems is provided through Modawi or, if Modawi is not available, the ERP software can also call up the functions of the eANV-Waste API directly.



In the extended version (called here through Modawi-Extended or a visualization), additionally to the CRUD practicality, complex reports based on Hadoop are also available. In this state of affairs, theeANV-Waste API stores the information and documents within the HDFS to form them on the market to Hadoop Make a call.

V. ADVANTAGES OF BIG DATA

A. *Better decision-making*

In the NewVantage Partners survey, 36.2 % of respondents aforementioned that higher decision-making was the quantity one goal of their massive information analytics efforts. In addition, 84.1 % had started operating toward that goal, and 59.0 % had old some measurable success, for associate degree overall success rate of sixty nine percent. Analytics will offer business decision-makers the data-driven insights they have to assist their corporations contend and grow.

B. *Increased productivity*

A separate survey from trafficker Syncsort found that fifty nine. % of respondents were victimization massive information tools like Hadoop and Spark to extend business user productivity. Modern massive information tools square measure permitting analysts to research a lot of information, a lot of quickly, that will increase their personal productivity. In addition, the insights gained from those analytics typically enable organizations to extend productivity a lot of loosely throughout the corporate.

C. *Reduce costs*

Both the Syncsort and the NewVantage surveys found that big data analytics were helping companies decrease their expenses. Nearly six out of ten (59.4 percent) respondents told Syncsort big data tools had helped them increase operational efficiency and reduce costs, and about two thirds (66.7 percent) of respondents to the NewVantage survey said they had started using big data to decrease expenses. Interestingly, however, only 13.0 percent of respondents selected cost reduction as their primary goal for bigdata analytics, suggesting that for many this is merely a very welcome side benefit.

VI. DISADVANTAGES OF BIG DATA

A. *Need for talent*

Data scientists and big data experts are among the most highly coveted and highly paid workers in the IT field. The AtScale survey found that the shortage of massive an enormous a giant knowledge ability set has been the amount one big knowledge challenge for the past 3 years. And within the Syncsort survey, respondents hierarchical skills and workers because the second biggest challenge once making an information lake. Hiring or coaching workers will increase prices significantly, and also the method of exploit massive knowledge skills will take appreciable time.

B. *Data quality*

In the Syncsort survey, the number one disadvantage to working with big data was the need to address data quality issues. Before they can use big data for analytics efforts, data scientists and analysts need to ensure that the information they are using is accurate, relevant and in the proper format for analysis. That slows the reporting process considerably, but if enterprises don't address data quality issues, they may find that the insights generated by their analytics are worthless — or even harmful if acted upon.

C. *Cyber security risks*

Storing big data, particularly sensitive data, can make companies a more attractive target for cyber attackers. In the AtScale survey, respondents have consistently listed security as one of the top challenges of big data, and in the NewVantage report, executives ranked cyber security breaches as the single greatest data threat their companies face.

VII. FUTURE ENHANCEMENTS

A. *GIS-based Visualization*

Geographic information systems (GIS) are widely used formapping and analyzing spatial data; GIS has recently gained popularity in urban planning, environmental planning, traffic monitoring, and transportation mode.

B. *Computational Intelligence Algorithms for Smart City Big Data Analytics*

Computational intelligence algorithms, such as neural network, genetic algorithm, artificial bee colony and particle swarm optimization, cuckoo search algorithm, flower pollination algorithm, chicken swarm optimization, and bat algorithm, are effective, efficient, and robust in knowledge engineering, which comprises soft computing, machine learning, and data mining .

VIII. CONCLUSION

The significant increase in connected devices in urban cities has led to the rapid growth of data, which has elicited the attention of many researchers in different research domains. This paper aims to offer a comprehensive view of the role of big data in a smart city. In this context, we discussed the enabling technologies used in the smart city. The future business model and architecture with the aim of managing big data for smart city were also proposed, and the applications of the smart cities in which big data analytics can play an important role were discussed. Different case studies were also examined. Finally, several open research challenges were explained to provide the research directions to the new researchers in the domain. Big data can play an important role in terms of gaining valuable information and for decision-making purposes. However, big data research in a smart city is in its infancy and the discussed challenges that remain to be addressed make it a practical field.

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ARTICLES

Impact of Electronic waste on Environment

Guided by Prof. Sreeja S.S

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Abstract– **Electronic waste or e-waste refers to unwanted, obsolete or unusable electronic and electrical products. Ever increasing usage of electronics and electrical equipments has resulted in piling up of e-waste. The current practices of e-waste management in India encounters many challenges like the difficulty in inventorization, ineffective regulations, pathetic and unsafe conditions of informal recycling, poor awareness of consumers and reluctance on part of the stakeholders to address the issues. As a result toxic materials enter the waste stream with no special precautions to avoid the known adverse impacts on the environment and human health as well resources are wasted when economically valuable materials are dumped. The purpose of this paper is to find out various issues related to e-waste and suggest strategies for effective e-waste management in India.**

Keywords - e-*waste, environment, informal sector, recycling*

I. INTRODUCTION

Electronics waste, commonly known as e-scrap and e-waste, is trash we generate from surplus, broken and electronic devices. E-waste is the process of recovering material from old devices to use in new products. Electronic scrap components, such as CPUs, contain potentially harmful materials such as lead, beryllium. Recycling and disposal of e-waste may involve significant risk to health of workers and communities in developed countries and great care must be taken to avoid unsafe exposure in recycling operations and leaking of materials such as heavy metals from landfills and incinerator ashes. It is created when an electronic product is discarded after the end of its useful life. The rapid expansion of technology means that a very large amount of e-waste is created every minute.

Electronic waste may be defined as discarded computers, office electronic equipment, entertainment device electronics, mobile phones, television sets, and refrigerators. This includes used electronics which are reuse, recycling, or disposal as well as reusable's (working and repairable electronics) and secondary scraps like (copper, steel, plastic, etc.). The term "waste" is reserved for residue or material which is dumped by the buyer rather than recycled, including residue from reuse and recycling, because loads of surplus electronics are frequently commingled (good, recyclable, and non-recyclable). Several public policy advocates apply the term "e-waste" and "e-scrap" broadly to all electronics.

II. E-WASTE RECYCLING FACTS

- In 2016, 44.7 million metric tons of e-waste were generated, the equivalent of almost 4,500 Eiffel Towers.
- Only 41 countries have official e-waste statistics. In countries where there is no national e-waste legislation in place, e-waste is probably categorized as other or general waste.
- Between 2014 and 2017, the percentage of world population covered by e-waste legislation jumped from 44% to 66%.
- As of 2016, about 95% of Americans own a cell phone. The average U.S. cell phone life cycle is 21.6 months.
- Every year, Americans throw away around 9.4 million tons of e-waste, which is more than any other country.
- Every year, between 20 and 50 million tons of e-wastes are tossed into landfills, and just 10 to 18 percent of total e-waste generation is recycled. Current E-waste recycling rate is just 12.5 percent.
- Every year, Americans throw away cell phones containing over $60 million in silver and gold.
- Much of the e-waste generated in the U.S. is exported to China, India, Pakistan, Nigeria and Ghana creating a dumping problem in those countries.[1]

III. FREQUENTLY RECYCLED ELECTRONICS

With such a very short useful life, these electronics transition into e-waste at a rapid pace. In fact, it was estimated that there were 422 million unused and unwanted cell phones accumulating in people's homes by the end of year 2015.

Globally, a cell phone is sold to around one of every four people on an annual basis. Every year millions of electronic devices such as mobile phones, TVs, computers, laptops, and tablets reach the end of their useful life.[2]

Unfortunately, the majority of these electronic products end up and just a tiny percentage comes back as new electronic devices. According to studies, in 2014 alone, 41.8 million tons of electronic waste (e-waste) was discarded worldwide, with only 10 to 40 percent of disposal done properly.

Electronics are full of valuable materials including copper, tin, iron, aluminum, fossil fuels, titanium, gold, and silver. Many of the materials used in making these electronic devices can be recovered, reused and recycled, including plastics, metals, and glass. In a report, Apple Company revealed that it recovered 2,204 pounds of gold worth $40 million from recycled iPhones, Macs and iPads in 2015.[2]

IV. Benefits of electronically waste recycling

Recycling e-waste has various environmental and economic benefits:

According to EPA, recycling one million laptops can save the energy equivalent of electricity that can run 3,657 U.S for a year. EPA also states that by recycling one million cell phones, we can recover 75 lbs of gold, 772 lbs of silver, and 35,274 lbs of copper and 33 lbs of palladium.

According to the Electronics Take Back Coalition, it takes 1.5 tons of water, 530 lbs of fossil fuel and 40 Ibs of chemicals to manufacture a single computer and monitor. Also 81 percent of energy associated with a computer is used during production and not during operation.

Electronics contains various toxic and hazardous chemicals and materials that are released into the environment if we do not dispose of them properly. Recycling e-waste enables us to recover various valuable metals and other materials from electronics, saving natural resources (energy), reducing pollution, conserving landfill space, and creating jobs.[4]

V. Problems caused by electronic waste

Rapid technology change, low initial cost and even planned obsolescence have resulted in a fast growing problem around the globe. Electronic waste is a valuable source for secondary raw materials if treated properly and if not treated properly, it is a major source of toxins. Technical solutions are available but in most cases a legal framework, a collection system, logistics and other services need to be implemented before a technical solution can be applied.
Delhi and Bangalore in India and China have electronic waste processing areas. Burning and disposal are causing environmental and health problems due to waste.

Electronic waste is of concern largely due to the toxicity of some of the substances if processed improperly. The toxicity is due in part to lead, mercury, cadmium and a number of other substances. A computer monitor may contain more than six percent lead by weight. Up to 38 separate chemical elements are removed from electronic waste items.

Electronic waste processing systems have matured in recent years following increased regulatory, public, and commercial scrutiny, and a commensurate increase in entrepreneurial interest. Part of this evolution has involved greater diversion of electronic waste from energy intensive, down-cycling processes (e.g. conventional recycling) where equipment is reverted to a raw material form. This diversion is achieved through reuse and refurbishing. [4]

VI. Human health and safety from E-waste

A. Residents living

Residents living around the electronic waste recycling sites, even if they do not involve in e-waste recycling activities, can also face the environmental exposure due to the food, water, and environmental contamination caused by electronic waste, because they can easily contact to electronic waste contaminated air, water, soil, dust, and food sources.

Studies show that people living around electronic waste recycling sites have a higher daily intake of heavy metals and a more serious body burden. Potential health risks include mental health, impaired cognitive function, and general physical health damage. DNA damage was also found more prevalent in all the e-waste exposed populations (i.e. adults and children) than the populations in the control area. DNA breaks can increase the likelihood of wrong replication and thus mutation, as well as lead to cancer.

B. Children

Children are especially sensitive to electronic waste exposure because of several reasons, such as their smaller size, higher metabolism rate, dermal, hand-to-mouth, and take-home exposure. They were measured to have an 8-time potential health risk compared to the adult e-waste recycling workers. The highest concentrations of lead were found in the children of parents whose workshop dealt with circuit boards and the lowest was among those who recycled plastic.

Exposure to e-waste can cause serious health problems to children. Children's exposure to developmental neurotoxins containing in electronic waste such as lead, mercury, cadmium, chromium can lead to a higher risk of lower IQ, impaired cognitive function, and other adverse effects. In certain age groups, a decreased lung function of children in e-waste recycling sites has been found. Some studies also found associations between children's e-waste exposure and hearing loss, and decreased vaccine antibody filters in electronic waste recycling area.[5]

VII. Electronic waste in India

India has emerged as fifth largest electronic waste producer in the world. Computer devices account for nearly 70% of e-waste, with the contribution of telecom sector being 12%, medical equipment being 08%, and electric equipments being 07% of the annual e-waste production. The Government, public sector companies, and private sector companies generate nearly 75% of electronic waste; with the contribution of individual household being only 16%.

Mumbai tops the list in producing electronic waste, followed by New Delhi, Bangalore and Chennai. State-wise Maharashtra ranks first in generation of electronic waste, followed by Tamil Nadu and Uttar Pradesh. These pollutants are responsible for groundwater contamination, air pollution and soil acidification.

Appliances	Average weight (kg)	Iron (Fe) % weight	Non-Fe % metal weight	Glass % weight	Plastic % weight	Electronic component % weight	Others % weight
Refrigerators and freezers	48	64.4	6	1.4	13		15.1
Washing machine	40 to 47	59.8	4.6	2.6	1.5		31.5
PC	29.6	53.3	8.4	15	23.3	17.3	0.7
TV sets	36.2	5.3	5.4	62	22.9	0.9	3.5
Cellular phones	0.08 to 0.1	8	20	10.6	59.6		1.8

UNEP E-waste Assessment Manual Vol I (1) Data compiled from Waste from electrical and electronic equipment (WEEE)—quantities, dangerous substances and treatment methods, EEA Copenhagen (2003); (2) QWERTY and Eco-Efficiency analysis on cellular phone treatment in Sweden. TU the Netherland (2004)

Table 1. E-waste in India

VIII. Life cycle of the Electronic waste

Manufacturers, retailers, consumers, traders, exporters, scrap dealers, disassembles/dismantlers, smelters and recyclers are major stakeholders in e-waste supply chain. Electronic waste is an emerging problem as well as a business opportunity of increasing significance, given the volumes of Electronic waste being generated and the content of both toxic and valuable materials in them. The fraction including iron, copper, aluminium, gold and other metals in E-waste is over 60%, while pollutants comprise 2.70%. Therefore, recycling of Electronic waste is an important subject not only from the point of waste treatment but also from the recovery aspect of valuable materials. However the process of take back and disposal of Electronic waste is very complex, which involves various kinds of products, many people and enterprises, extensive areas, it is a huge and complicated system. [3]

IX. Conclusions and recommendations for E-waste

There exist many hurdles to e-waste management in India. So the steps should be taken to formalize the informal sector by strict implementation of rules and to levy heavy penalties on defaulters. The major challenges are to reduce E-waste through reuse, recycle, and recovery and reduced use of toxic substances, to invent labour intensive intermediate technology to recycle, recover an electronic waste safely and to distribute the responsibility of managing E-waste on one or more stakeholders.

There is urgent need of an effective Reverse supply chain managing Electronic waste. In the reverse supply chain of E-waste would be collected from all kinds of resources, and it would be delivered to a processor that can recycle valuable parts from E-waste and dispose rest hazardous components in environmentally sound manner. The producer may buy those recycled valuable parts as raw material from the processor; therefore a close loop supply chain would be formed.

In the process, companies can become more environmentally efficient through reusing and reducing the amount of materials used.

There is need of an effective take back program providing incentives for producers to design products that are less wasteful, contain fewer toxic components, and are easier to disassemble, reuse, and recycle may help in reducing the wastes and depose schemes to encourage consumers to return electronic devices for collection and reuse & recycling. There is need of more recycling facilities and development of infrastructure to handle e-waste effectively. Each state should develop its own scrap yards in the respective cities to warehouse e-waste.

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IoT Based Air Quality Indicator

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***Abstract*– In metropolitan cities now a days due to rise of real estate as well as infrastructure constructions the air quality has been decreasing day by day, Because of which the surrounding environment is getting affected. The least we could do is to have an air quality indicator, to check the air quality and take appropriate measures to it before it's too late. Breathing polluted air puts everyone at high risk for asthma and other respiratory diseases. The sensors would be able to detect carbon monoxide (CO) and particles. The measured values from the sensors can be processed by the central controller. The IoT device can be used as a central controller. The prepared information is put away in the cloud. Further calculations are done at the server side by recovering the qualities from the cloud and reports are produced likewise.**

Keywords – ***IoT, Sensors***

I. INTRODUCTION

It is really important to keep a track of the air quality where we are spending the most of the time i.e. at our home. If your residing near a construction site dust would be one of the major concerns as it could really affect a person having breathing problems. Constructions in a metropolitan city affects the majority due to a greater number of people living in a per square kilometer. Apart from dust, carbon monoxide Is also a major concern for example, if the carbon monoxide is above 100 ppm it makes human feel dizzy, nauseous and within minutes they could die. A lot of other gases can really affect the quality of the air hence it needs to be monitored.

Humans cannot detect the air quality by themselves until they feel they can't breathe properly hence a tool to detect would really come in handy.

The inspiration behind the proposed system was to design a real time monitoring of air quality in an easiest and financially savvy way by estimating the carbon monoxide and particle sensor using nodemcu (microcontroller) which will send the result of sensor reading to cloud. The sensor information can be seen on the cloud using a special IP address. Test outcomes are recorded in cloud so that any past information of testing can be fetched effectively

II. LITERATURE SURVEY

1. "Air Pollution Sensors: A new class of tools to measure air quality" paper presented by Dr. Paul A. Solomon and Dr. Melissa Lunden. This paper explains the new technologies that can be used to check the air quality using sensors which are available at an inexpensive cost.

2. "What is the Internet of Things: An Economic Perspective, Auto ID Labs White Paper" paper presented by E. Fleisch.. paper is targeted towards students, practitioners and researchers who are interested in understanding and contributing to the ongoing merge of the physical world of things and the Internet. From this paper we learnt that the sensors and elements like air could be combined with internet for its testing.

3. This reduces a lot of manual work involved in traditional system of air testing. by M. Spinola". This paper is about the essential things on cloud computing we need to be aware of before using cloud computing. From this paper we learnt that using cloud would be better than using the local server as the storage space and data could be fetched from cloud whenever necessary.

III. DO YOU HAVE EXISTING SYSTEM?

It is difficult to spot one as it is hardly used due to its lack of awareness and are mostly used by the government officials to monitor the quality of air around a construction site whether the contractor is following the air pollution norms set by the government while constructing an infrastructure Sorting System Details

IV. PROPOSED SYSTEM

It is difficult for the government to keep checking it now and then hence such less expensive sensors can be deployed to the surroundings or at the homes of the people residing near to the construction site. In such case a noise pollution sensor can also be implemented which can help to control the noise pollution around construction sites

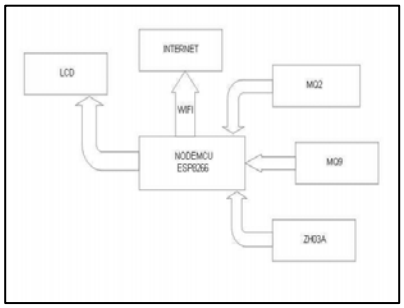
V. ADVANTAGES OF PROPOSED SYSTEM

To develop an effective IOT based monitoring of air quality for more desirable results, minimal cost, easy handling, less manual work and to reduce the time involved in lab testing. It limits the time required for testing the quality of water. This system eliminates the need of laboratory testing. Test results are recorded in cloud with the goal that any previous information or data of testing can be fetched easily.

VI. Tools Used

- LCD
- Nodemcu (ESP8266)
- MQ2 (Gas Sensor)
- MQ9 (Gas Sensor)
- ZH03A (Dust Sensor)

VIII. System Design



Nodemcu is the microcontroller that will send the result of the sensor readings to LCD and Internet. These readings are basically sent to the cloud in order to keep a record of it.

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A Study on Waste Management

Guided by Prof. Sreeja S.S

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Abstract– **This paper will discuss the problem of environmental pollution and waste management. Everything that surrounds us is directly or indirectly connected to the environment. Not only the man, but also other living beings as well as the nature have effects on environmental pollution. Environmental pollution is present from the very beginning of life, but today it is a serious problem that threatens the survival of mankind. Today, every person living on planet Earth is worried about environmental pollution because the consequences faced every day, through the air we breathe, the food and water we consume, through pollution and radiation we are exposed to. Also, the consequences of environmental problems are manifested through the lack of natural resources, extinction of plant and animal species, as well as the problems in the global ecosystems and biochemical processes. Based on the research problem we can hypothesize: Yes, waste management has a great impact on the environment.**

Keywords – ***environmental pollution, global ecosystem, natural resources***

I. INTRODUCTION

Waste management (or waste disposal) is the activities and actions required to manage waste from its inception to its final disposal. This includes the collection, transport, treatment and disposal of waste, together with monitoring and regulation of the waste management process. Waste can be solid, liquid, or gaseous and each type has different methods of disposal and management. Waste management deals with all types of waste, including industrial, biological, and household. In some cases waste can pose a threat to human health. Waste is produced by human activity, for example the extraction and processing of raw materials.

Waste management is intended to reduce adverse effects of waste on human health, the environment or aesthetics. A large portion of waste management practices deal with municipal solid waste (MSW) which is the bulk of the waste that is created by household, industrial, and commercial activity.

Throughout most of history, the amount of waste generated by humans was insignificant due to low population density and low societal levels of the exploitation of natural resources. Common waste produced during pre-modern times was mainly ashes and human biodegradable waste, and these were released back into the ground locally, with minimum environmental impact. Tools made out of wood or metal were generally reused or passed down through the generations. However, some civilizations do seem to have been more profligate in their waste output than others. In particular, the Maya of Central America had a fixed monthly ritual, in which the people of the village would gather together and burn their rubbish in large dumps.

II. ISSUES AND CAUSES OF WASTE

The man, along with all other living beings from the beginning of its existence is closely linked with the entire inanimate and living nature that surrounds it. This interaction is the basis of the whole modern right of environmental protection. Through his own development, the man developed his interest in the way and manner that would harmonize with the nature that surrounds it, to ensure the conditions necessary for their survival. With each new discovery (ranging from tools for tillage and wheel all the way to modern computer technology) man makes bigger part of the eternal desire to reconcile nature and its needs. Contemporary urban, industrial, economic and technological development has provided great benefits to man, but the industrial air and water pollution, uncontrolled deforestation and their conversion into agricultural land, destruction of the ozone layer and global warming of the planet followed by climatic changes, the accumulation of various wastes, including radioactive as well as the eradication of certain plant and animal species, are just some of the negative consequences of human activities, which, however, seriously endangering his own survival. At present time, the protection of the environment is of great importance in the prevention and elimination of these contradictions. The right to protect the environment today should be seen as a unique supranational (international), national and local unit. Therefore, in order for the normative framework to succeed, actions must be taken at the universal, national, regional and local levels. Today we can say that we live in a world of waste, because of population growth and production increasing amounts of waste that makes landfill are becoming more numerous and increasingly degrade the environment. Every day a huge amount of waste, equally as in the villages and in agricultural areas is produced. Every year, about 10 million tons of oil products reaches rivers and oceans and has more than 500 billion tons of industrial waste. Industrial facilities and transport throw into the atmosphere about a billion tons of aerosols and ash. At the landfill waste is collected for years. In the wild landfill reaches up to 70% of total waste. The biochemical processes of decomposition of waste adversely affect the environment.

As for municipal waste that contaminates the soil and plants, air, groundwater and surface water on them in huge quantities reproduce rats, mice and insects which contributes to the spread of infection. This new situation poses a threat to human health, for both present and future generations. This imposes the problem of protecting the environment through waste management. A particular problem is hazardous waste (chemical, biological and nuclear) with a strong polluting effect and the many negative consequences for human health and the environment. In the early 90s of the 20th century in developing countries, there are 100 - 330kg of solid waste per capita in the European Union, the number was 414, and in North America 720kg. The global problem of all countries of the world is that there is an increase of waste, both in the amount of waste produced, as well as the amount of waste per person. The big problem is that this waste is not processed; instead, it is disposed of in landfills that are huge and located in the vicinity of cities and represent dangerous pollutants to air, water and land.

III. TYPES OF WASTE

A. Liquid Waste: Liquid waste is commonly found both in households as well as in industries. This waste includes dirty water, organic liquids, wash water, waste detergents and even rainwater. You should also know that liquid waste can be classified into point and non-point source waste. All manufactured liquid waste is classified as point source waste. On the other hand, natural liquid waste is classified as non-point source waste. This is best get in touch with waste removal experts, such as 4 Waste Removals, to dispose of liquid waste properly.

Fig 1. Liquid waste that flows in the water bodies nearby.

B. Solid Rubbish: Solid rubbish can include a variety of items found in your household along with commercial and industrial locations. Solid rubbish is commonly broken down into the following types: 1. Plastic waste – This consists of bags, containers, jars, bottles and many other products that can be found in your household. Plastic is not biodegradable, but many types of plastic can be recycled. Plastic should not be mix in with your regular waste, it should be sorted and placed in your recycling bin.

2. Paper/card waste – This includes packaging materials, newspapers, cardboards and other products. Paper can easily be recycled and reused so make sure to place them in your recycling bin or take them to your closest Brisbane recycling depot.

3. Tins and metals – This can be found in various forms throughout your home. Most metals can be recycled. Consider taking these items to a scrap yard or your closest Brisbane recycling depot to dispose of this waste type properly.

4. Ceramics and glass – These items can easily be recycled. Look for special glass recycling bins and bottle banks to dispose them correctly.

Fig 2. Solid waste dumped in the dumping grounds.

If you still cannot grasp the concept of recycling, then an incredibly easy and efficient way to dispose solid rubbish is by hiring a Brisbane waste removal company, like 4 Waste Removals, to take care of your recycling for you. We will removal all of your rubbish and ensure it is disposed of properly.

C. Organic Waste: Organic waste is another common household. All food waste, garden waste, manure and rotten meat are classified as organic waste. Over time, organic waste is turned into manure by microorganisms. However, this does not mean that you can dispose them anywhere. Organic waste in landfills causes the production of methane, so it must never be simply discarded with general waste. Instead, look to get a green bin from the Brisbane council, or hire a green skin bin or garden bag for proper waste disposal.

Fig 3. Waste generated from vegetables, fruits and other edible products.

D. Recyclable Rubbish: Recyclable rubbish includes all waste items that can be converted into products that can be used again. Solid items such as paper, metals, furniture and organic waste can all be recycled. Instead of throwing these items in with regular waste, which then ends up in landfills, place them in your yellow recycling bin or take them to your local Brisbane recycling depot. If you're unsure whether an item is recyclable or not, look at the packaging or the diagrams on the lid of your yellow recycling bin. Most products will explicitly state whether they are recyclable or not.

Fig. 4. Waste that can be recycled or reused for same or other purposes.

E . Hazardous Waste: Hazardous waste includes all types of rubbish that are flammable, toxic, corrosive and reactive. These items can harm you as well as the environment and must be disposed of correctly. Therefore, I recommend you make use of a waste removal company for proper disposal of all hazardous waste.

Fig. 5. Hazardous waste: corrosive, reactive, ignitable.

F. Medical waste: The waste that is created in the health and veterinary institutions, regardless of its composition and origin, is a medical-veterinary waste. This is a heterogeneous mixture of municipal garbage, infectious and laboratory waste, packaging, medicines and other pharmaceutical and chemical waste. Hazardous medical waste, which accounts for 14% of the total amount of medical waste consists of the following groups of waste:

1. Infectious waste - from microbiology laboratory equipment, supplies and accessories that came into contact with the blood or infectious patients used in surgical procedures, waste with hemodialysis, gloves, trash infected experimental animals.

2. Sharp Objects, needles, syringes, scalpels and other objects that can cause a sting or cut.

3. Gross, of black and gray parts of the human body (tissues, organs removed during surgery), experimental animals, anatomical parts of animals.

4. Pharmaceutical Industrial waste drugs and chemicals that have been returned to the departments from where they are taken or expired.

5. Chemical waste- discarded solid, liquid or gaseous chemicals that are used in medical or experimental procedures, cleaning or disinfecting.

6. Radioactive of black and gray contaminated materials, equipment, solutions, corpses experimental animals.

7. Content of heavy metals from the waste present compounds of mercury, lead, arsenic, as well as thermometers, devices for measuring blood pressure.

Fig. 6. Waste generated at medical facilities such as physicians offices, dental practices, blood banks, veterinary clinics and medical laboratories

V. VARIOUS METHODS OF WASTE DISPOSAL

Although there are many methods available to dispose of waste. Let's take a look at some of the most commonly used methods that you should know about waste management.

A) Landfills:

Throwing daily waste/garbage in the landfills is the most popularly used method of waste disposal used today. This process of waste disposal focuses attention on burying the waste in the land. Landfills are commonly found in developing countries. There is a process used that eliminates the odors and dangers of waste before it is placed into the ground. While it is true this is the most popular form of waste disposal, it is certainly far from the only procedure and one that may also bring with it an assortment of space. This method is becoming less these days although, thanks to the lack of space available and the strong presence of methane and other landfill gases, both of which can cause numerous contamination problems. Landfills give rise to air and water pollution which severely affects the environment and can prove fatal to the lives of humans and animals. Many areas are reconsidering the use of landfills.

Incineration/Combustion: Incineration or combustion is a type disposal method in which municipal solid wastes are burned at high temperatures so as to convert them into residue and gaseous products. The biggest advantage of this type of method is that it can reduce the volume of solid waste to 20 to 30 percent of the original volume, decreases the space they take up and reduce the stress on landfills. This process is also known as thermal treatment where solid waste materials are converted by Incinerators into heat, gas, steam and ash. Incineration is something that is very in countries where landfill space is no longer available, which includes Japan.

B) Recovery and Recycling:

Resource recovery is the process of taking useful discarded items for a specific next use. These discarded items are then processed to extract or recover materials and resources or convert them to energy in the form of useable heat, electricity or fuel. Recycling is the process of converting waste products into new products to prevent energy usage and consumption of fresh raw materials. Recycling is the third component of Reduce, Reuse and Recycle waste hierarchy. The idea behind recycling is to reduce energy usage, reduce volume of landfills, reduce air and water pollution, reduce greenhouse gas emissions and preserve natural resources for future use.[9]

C) Plasma gasification:

Plasma gasification is another form of waste management. Plasma is a primarily an electrically charged or a highly ionized gas. Lighting is one type of plasma which produces temperatures that exceed 12,600 °F . With this method of waste disposal, a vessel uses characteristic plasma torches operating at +10,000 °F which is creating a gasification zone till 3,000 °F for the conversion of solid or liquid wastes into a syngas. During the treatment solid waste by plasma gasification, the waste's molecular bonds are broken down as result of the intense heat in the vessels and the elemental components. Thanks to this process, destruction of waste and dangerous materials is found. This form of waste disposal provides renewable energy and an assortment of other fantastic benefits.

D) Composting:

Composting is a easy and natural bio-degradation process that takes organic wastes i.e. remains of plants and garden and kitchen waste and turns into nutrient rich food for your plants. Composting, normally used for organic farming, occurs by allowing organic materials to sit in one place for months until microbes decompose it. Composting is one of the best methods of waste disposal as it can turn unsafe organic products into safe compost. On the other side, it is slow process and takes lot of space.

VI. WASTE DISPOSAL HAS ITS DISADVANTAGES

1. If you make a wrong selection of underground landfill, it can contaminate groundwater.

2. When waste is buried and located in the middle of the country, there is no oxygen and its decomposition. Biogas is formed, which consists of various hydrocarbons, mostly methane. Biogas is spread horizontally and can reach the basements of buildings and in contact with open flames it can ignite and explode.

3. When waste is decomposed, its volume decreases, and this causes sagging area, so that in these places we cannot make buildings and other facilities.

VII. CONCLUSION

The environment is changing through development of the industrial revolution and the beginning of the use of fossil fuels. people are thinking about this problem more and more, because it should not allow the industry to continue to develop and harm the environment. This way of thinking has led to the emergence of the concept of sustainable development. This concept implies the continued development of the industry in a way that has minimal environmental impact. To change the quality of the ecosystem brings harmful effects of pollutants present in the environment and thus to increase the potential negative impacts on human health in several ways. The survival of man and nature are brought into question trough this industrial mode of production that was supposed to make the man the master of nature. Pollution of the basic elements of the environment (air, water and land) reached alarming results. Landscapes and spaces that are beyond the reach of human activities still exist. People recognized and legally

protected such natural goods. The life and working life of the man carried out in the urban areas and industrial zones, and only rare moments of rest in an oasis of pure nature. Some types of waste represent a major potential threat to the environment and human health. The company did not immediately and fully understand this danger. In many countries there are still no regulations on waste management. The amount of hazardous waste has increased dramatically in the last period due to different types of pesticides that are applied in agriculture and industrial waste containing toxic and cancerogenic substances. Worsening situation of global environmental - global warming, ozone layer depletion, acidification of the environment with the occurrence of acid rain and its consequences of global environmental problems: deforestation, soil degradation, loss of biodiversity and stocks of clean drinking water- is the result of deteriorating environmental situation in different countries and regions where environmental pollution is most intense. Reducing environmental pollution is an important goal of sustainable waste management. Recycling is one of the useful methods aimed at maximum utilization of energy and raw materials from waste. Most countries are opting for recycling because in addition to eliminating waste they see economic solutions. Recycling keeps raw materials and energy. From discarded and useless products obtained raw materials that would be in a different situation should draw from natural resources. The growth of population and production of larger quantities of waste to landfill seems to become increasingly numerous and increasingly degrade the environment.

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Alertness and Awareness about E-Waste Management

Guided by Prof. Sreeja S.S

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***Abstract*—the aim of this research paper is to acknowledge the awareness, alertness, knowledge, perception, and attitude of students and teachers about existent, risk and management of E-waste which is the rapidly increasing problems of the world. It also tried to identify current e-waste management practiced by the students and teachers. Survey, method of research was used to find out the awareness of students and teachers regarding e-waste management. The questioner form is distributed among the different people via different medium to get audience to the questioner and page was used to collect data on which research paper is designed. It can be easily seen that every age group has their own way to solve the problem and capability to deal with the related issues, and here by collecting there view and thoughts towards E-waste we will see that how much people are actually aware of E-waste management.**

Keywords—E-waste, E-waste management, Technology awareness, Effects of E-waste.

I. INTRODUCTION

Increased use of electrical equipment and machine in enormous population and changing consumption pattern is generating the different kind of waste which is really getting very hazardous for the life on the planet.[1] Since Electronic wastes are highly toxic and take lots of efforts to decompose in proper ways. Modern times have undoubtedly enhanced the quality of our lives[1]. These hazardous and other wastes cause a great threat to the human health and to overcome the issues we have that how much people are aware of e-waste management. Different Electronic waste, it include all the product material which include circuits and wire kind of thing.

Electronic board mostly includes the silicon product and instead of that this electronic product has maximum amount of LED content in it. Which is highly toxic and takes 100's of years to decompose. Disposal of these e-wastes without appropriate measures can cause health and environmental hazards to humans, livestock's and to the ecosystem. Management of these wastes simply means waste keeping, collection, treatment and disposal in a safe manner so that it can avoid harm to humans and environment. Lack of awareness and related information on effective and appropriate management steps associated with e-waste may cause hidden threat to human health and environment. This study check the knowledge and awareness implication of E-waste [2]. Based on the above background information, this study was carried out to assess the implication of knowledge and awareness on E-waste management among people belongs to different age groups.

II. IMPACTS OF AWARENESS ON E-WASTE MANAGEMENT

There are chances of accidents like cuts and burns during the dismantling, acid baths and incineration process, in addition, exposure to following chemicals have many long-term effects. Phthalate such as DEHP in monomer from effects the development of testis, butylbenzyl phthalate and dibutyl phalate to phthalates in pregnancy reduces ano-general index in male child [2].

If a person is already aware of the technology or a different way to handle such issues then there would be no extra effort or investment required to manage e-waste issues. There are the chemicals which should needed to be handled by consumer. Other than this, if a consumer is already trained or aware to decompose electrical material before throwing it out there it would be cost saver and this could bring a new level of business opportunity in the world [3].

Awareness of e-waste management in different age groups has to be taken into consideration which can be positive or negative:

A. Positive Impacts

[1] Consumer will know what to do with electrical and electronic waste can be used to recycle.
[2] Production of new circuit material can go down if it can be used appropriately.
[3] Consumer can have a good environment.
[4] Health and life on the planet will improve.

B. Negative Impacts

If a consumer is not aware with the current e-waste problem solving information technology it will be difficult for customer to solve their little issue.

1. Lack of awareness will make consumer to face health related problems.
2. If they are not aware with the issue then a fertile land can be made unfertile just because it is not taken care properly.

III. RELATED SURVEY AND RESPONSE

In this portion of paper, we analyze why and how much people is not actually aware with the e-waste management in different age group:

Hence, a survey was taken which consisted of questions regarding how Awareness implication on e-waste management in different age group**.**

Here are some of the questions and the responses of the survey taken. The report is based on the 57 response taken through survey:

The survey is maximum responded by the age group 14-24, and then comes 25-36, 37- 48 and 49 or above age group. And they have family of 4-5 people.

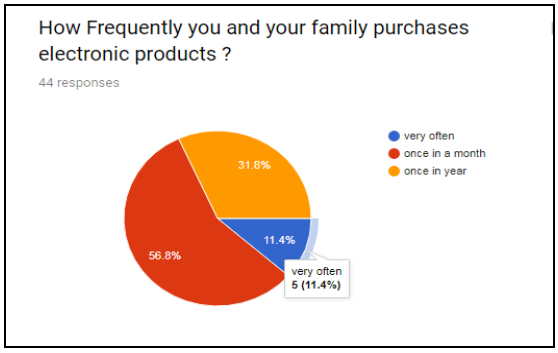

Fig: 1: Analysis of family frequent purchases

As shown in figure 1 : it conclude that most of consumer like to purchase electronic product once in month rather than once in year, which clearly stats that people are using technology very rapidly.

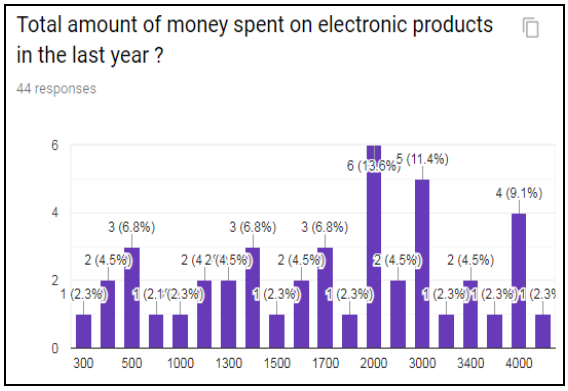

Fig: 2: Analysis of amount spent on purchases

As shown in figure 2: It concludes that most consumers like to purchase electronic product ranging from 2000 to 3000. Which clearly stats that people are using technologies which are cost effective and best useable.

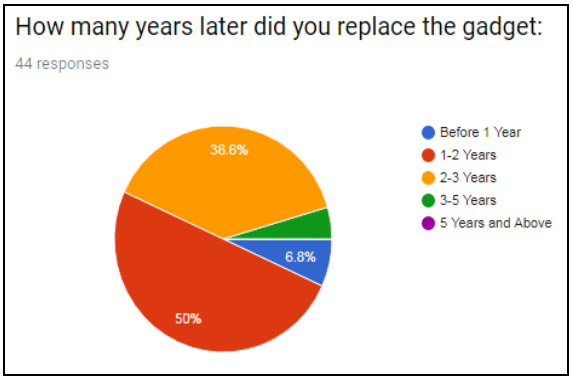

Fig 3: Analysis of frequent replacement of device

As shown in figure 3: It conclude that most of consumer replace their gadget often within just 1 to 3 years. Which clearly stats that people often like to change there gadgets.

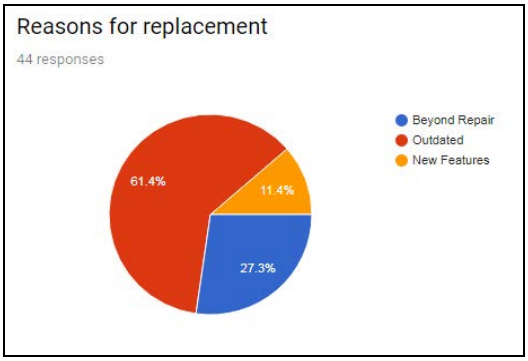

Fig 4: Analysis of reason for device replacement

As shown in figure 4: Clearly shows that consumer prefer update when new update of device launches in market, to get rid of the outdated electronic devices and to get new features.

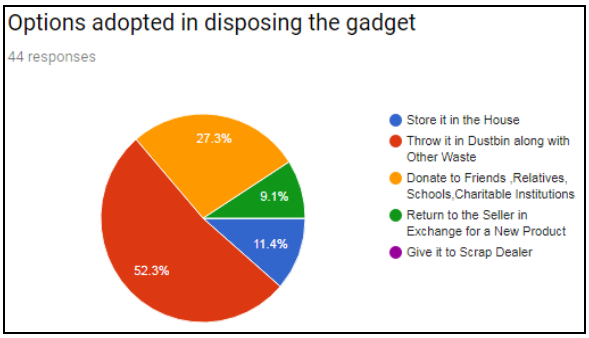

Fig 5: Analysis of options consumer prefer before dispose gadget

As shown in figure 5: consumer does not care about the disposal of e-wastes,52% people throw their product directly into dustbin and 27% of people donate their product to their friends and relatives.

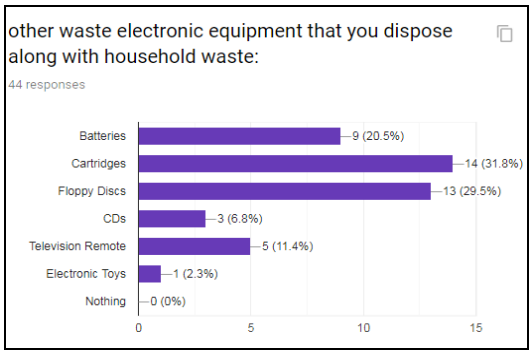

Fig 6: Analysis of other product which consumer dispose with gadget

As shown in figure 6: It is clearly understood that consumer does not care about any e–waste products and they do throw other products into dustbin instead of recycling.

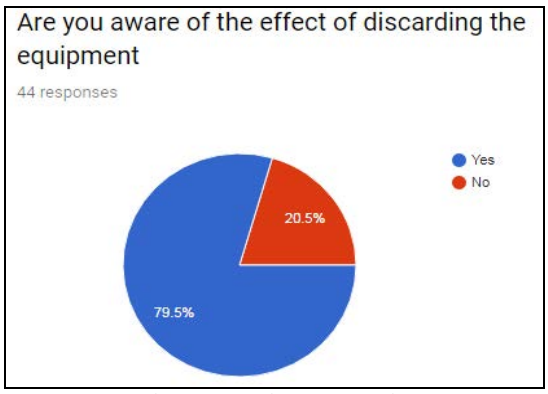

Fig 7: Analysis of awareness of consumer before disposing

As shown in figure 7:It is clearly understood that consumer does not aware about any e–waste products toxic effects they do throw other products into dustbin instead of recycling.

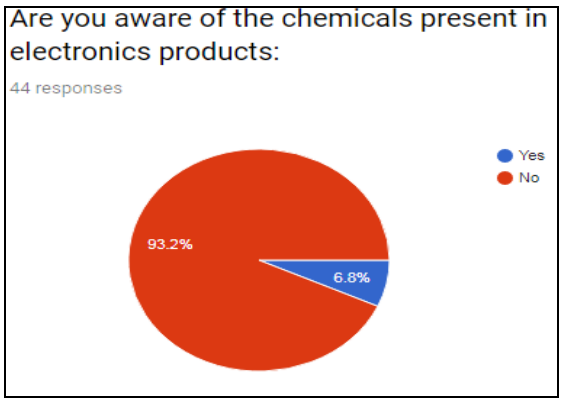

Fig 8: Analysis of awareness of consumer about chemical present in electronic waste.

As shown in figure 8: It accepted that consumer must not aware of chemicals present in electronic waste, as they not believe that some electronic elements react with different gases.

Fig 9: Analysis of awareness of consumer about companies that collects electronic waste

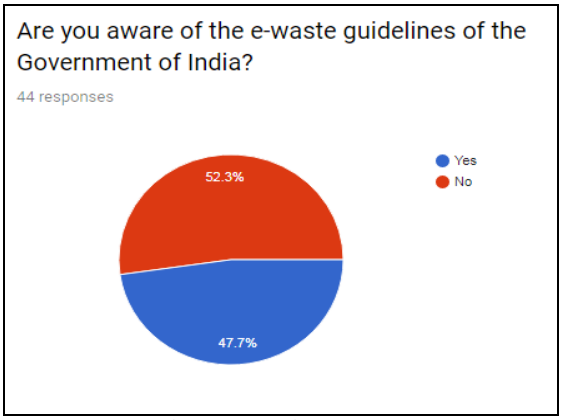

Fig 10: Analysis of awareness of consumer about government e-waste guideline

As shown in figure 9 & 10: Consumer does not know and don't even care about the chemicals and other toxic materials which are coming through e-wastes devices, but 50% of them do know about the companies who collects e-waste material, and 52% of consumers follow government of India guidelines.

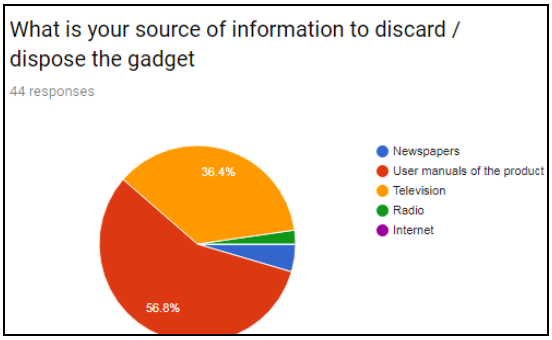

Fig 11: Analysis of awareness of consumer source of knowledge of disposal

As shown in figure 11: It concludes that 56% of people use user manual before using any advance electrical product,and 36% of people learn it from television and other prefer newspaper, radio and internet.

IV. CONCLUSION

According to survey it is clearly concluded that most of the consumer who aware with the e-waste management are categorized under young generation, i.e. 14-24,and other belongs to age group 24-35. Whereas still people behaviour towards e-waste management is careless, and they are just getting lost into new devices and their features. To handle such situation government have to still initiative on it.

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Literature Review on Hazardous Waste Management System

Guided by Dr. Vinita Gaikwad

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Abstract— **Hazardous waste is the waste that poses substantial or potential threats to public health and the environment. The sources of hazardous waste are basically agricultural and agro industries, medical facilities, commercial centers, household and the informal sectors. Rapidly growing industries in the Mumbai city have contributed in the production of large part of hazardous waste material. Therefore, to reduce environmental hazardous, proper attention is required during storage, segregation, transportation and disposal of waste, because it cannot be disposed of by common means like other by products of our daily lives. Hazardous waste management is an important issue in our city now days. Unscientific disposal of hazardous waste and only few secured landfill sites available in the city for disposal of hazardous waste in an environmentally sound manner posed serious risk to the environment system. This paper is a review report about the hazardous waste management in Mumbai city.**

Keywords—-- *Waste Management, Hazardous Waste*

I. INTRODUCTION

Hazardous waste can be the reason for many disasters that occur in the nature. No human property is safe from the risk of natural hazard. Therefore, it is vital that researchers and decision makers have access to all available hazards' information. Various disasters can occur due to hazardous waste. Hazardous waste may be found in different states such as gaseous, liquids or solids. A hazardous waste is a special type of waste because it cannot be disposed of by common means like other by product of our everyday lives. Depending on the physical state of the waste, treatment and solidification processes might be required. Hazardous waste can be prevented with the help of waste awareness in public places. In simple words, e-waste is an electronic waste which has been created and increased by the people without understanding the environmental worse effects. But it is not only the mistake of the people but also the companies who manufactures the electronic items. Electronic goods are necessary for the consumers for their comfort but understanding the effect of the E-waste items is also necessary to everyone [1].

II. REVIEW OF LITERATURE

Being an industrializing country India's contribution to the generation of hazardous is being considered significant. The waste is generated from a wide spectrum of industries in the country. The management of these wastes poses many challenges for the industry and the government as well. Policy and legislative frameworks have been put in place while a host of international programmes are supplementing national efforts in containing the problem. The article provides an overview of the hazardous waste management scenario in India [2].

E-waste includes various unwanted electrical and electronic devices or appliances such as Televisions, Refrigerators, Air Conditioners, Mobiles and other Gadgets. Small items like batteries, modems, routers, pen drives, cables, remote controls can also be part of e-waste. The major rules for e-waste under category of "hazardous" started in India from the year 2003:[2]

Year	Rules
2003	the Hazardous Waste (Management and Handling)
2008	the Hazardous Waste (Management Handing and Transboundary Movement)
2011	e-waste (Management and Handling)
2015	the e-waste (Management)
2016	the e-waste (Management)

Table.1: Rules Year wise

III. CHALLENGES FOR MANAGING WASTE

The greatest challenge for the government and other stakeholders is the e-waste management because it consists of toxic, expensive, and hazardous materials. Risks for humans have increased due to e-waste [2]. Workers from e-waste industries use simple and even primitive methods to dispose of e-waste, such as open burning of circuit boards and plastic waste, exposure to toxic solder, acid operations in enclosed premises with in-adequate ventilation, river dumping of acids and wide spread general dumping; all of these processes are extremely polluting and harmful to human beings. After disposing electronic devices, some of the hazardous substances generated are lead, mercury, Chromium and Barium. Lead gets spread in the air and water, which causes negative effect to human lives such as high blood pressure which lead to cardiovascular diseases. Children of affected humans may born with lower IQs. Other substances cause brain disorders, lung cancer, kidney damage, skin diseases etc. [3][4]

IV. CONCLUSION

In current scenario, e-waste management is a complex issue is metropolitan cities. Inadequate knowledge of consumer awareness about environmental consciousness and affect the implementation of e-waste management in the Indian context, lack of knowledge sharing between contractual companies for green recycling practices etc.

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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.

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