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Contents

Dr. D. Y. Patil Institute of Management & Research,
Pimpri, Pune – 411 018, M. S. India.

Directors Message

I am happy to present the current issue of the JBSR journal of DYPIMR. It is an annual blind fold peer reviewed Online and Print journal in the areas of Management and Information Technology. This Journal is published by Dr. D. Y. Patil Unitech Society. Dr. D. Y. Patil Institute of Management & Research, Pimpri, Pune.

Our journal covers academia and industry on good quality, original studies, Management cases and recent trends in Business Management and Technology. I firmly believe that the current issue will turn out to be researcher's enchantment.

We were able to accomplish these progresses with the abundant support and cooperation from the management of Dr. D. Y. Patil Unitech Society, and also with the teamwork of all faculty members, students, and staff of DYPIMR. I also thank all our reviewers, authors and readers for their continuous support and dedication to look forward in taking the journal to achieve new milestones. I also request the academia and corporate fraternity for their feedback or suggestions, which will help us in striving for excellence.

I wish you ALL THE BEST for your future endevour.!!!!

Dr. Rakesh Dholakia

Director, DYPIMR

About JBSR

The Journal of Business Studies & Research (JBSR) is an annual blind fold peer reviewed, Online and Print journal published by DYPIMR Publication. The Journal has Print ISSN: 2455-6610 and Online ISSN: 2455-233X It is a double-blind refereed journal. It emphasizes on innovation, advancement, development, research and dissemination of knowledge in the fields of management and Computer Technology. We do not charge authors to publish with us.

We at DYPIMR believes to map new edges in emerging and developing technology areas in research and to link with centres of excellence to deliver imposing exposure and references in focused and specialist fields. Research articles, case studies, technical reports etc. are invited for submission.

Manuscripts submitted to the Journal are only accepted on the understanding that (a) they are subject to editorial review (generally by two independent reviewers); (b) they have not been, and will not be, published in whole or in part in any other journal

AIM AND SCOPE

The Journal of Business Studies & Research (JBSR) is an annual blind fold peer reviewed, Online and Print journal published by DYPIMR Publication. The Journal has Print ISSN: 2455-6610 and Online ISSN: 2455-233X It is a double-blind refereed journal. JBSR aims at providing an intellectual platform for high quality research encompassing all the sub-domains of Management to all the academicians, research scholars and students.

The journal allows the research scholars to interchange and share their study and research ideas in the recent trends in business management and computer technology .This Journal mainly provides a premier interdisciplinary platform for the researchers, educators and practitioners to present and discuss their authentic and innovative ideas, trends and concerns as well as challenges encountered and solutions adopted in the advanced fields of Business Management and Computer Technology.

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"Big Data: In Education Sector"

Chaitrali Kumbhar, MCA-II, DYPIMR
Ms. Swati Narkhede, Asst. Prof., MCA, DYPIMR

Abstract

Big data is one of the most popular technical research topics in the current time. Big data provides opportunities to educational Institutes to use their Information technology resources strategically to improve the education quality and guide students to higher education rates of completion, student persistence and outcomes.

Big data can afford educational institutions opportunities to shape modern and dynamic education system in which every individual student can have the maximum benefits and can greatly contribute towards improving the quality of education

Keywords: Big data, analytics, Education.

I. Introduction

Information Technology is a key enabler of many of today's technological innovations that have led to improvements that benefit society in many areas including education, business, security and health care.

Technological innovations increased affordability and use of digital services have led to a situation where extremely large amount of data are being generated through use of devices. Big data can therefore help institutions to male use of data that is generated in the ecosystem**.**

II. Big data

Big data is also a data but with a huge size. Data is a term used to describe a collection of data that is huge in volume and yet growing exponentially with time. In today's business landscape, big data has become the most valuable asset for any business. The more a business can harness big data, the better its position becomes from where it can carry out analysis that helps to develop useful business decisions. Across every industry, big data is being heavily used to predict future trends, recognize patterns, and draw new conclusions.

III. Advantages of big data

- **Improved business processes**:

Probably the biggest advantage of big data is it helps businesses to gain a huge competitive advantage. Apart from being able to understand, as well as, target customers better, analyzing big data can result in the improvement and optimization of certain facets of business operations.

- **Fraud detection:**

This advantage of using big data comes from the implementation of machine learning technologies. It helps banks and other financial institutions to detect frauds like fraudulent purchases with credit cards often before even the cardholder gets to know about it .

- **Improved customer service:**

One of the most common goals among big data analytics programs is improving customer service. Today's businesses capture a huge amount of information from different sources like customer relationship management (CRM) systems, social media together with other points of customer contact. By analyzing this massive amount of information they get to

know about the tastes and preferences of a user. And with the help of the big data technologies, they become able to create experiences which are more responsive, personal, and accurate than ever before.

IV. Disadvantages of Big data

- **Privacy and security concerns:**

Probably the biggest disadvantage of big data is that it can make businesses a softer target for cyber attackers. Even giant businesses have experienced instances of massive data breaches. However, with the implementation of GDPR, businesses are increasingly trying to invest in processes, protocols, and infrastructure to be able to maintain big data.

- **Need for technical expertise:**

Working with big data needs a great deal of technical proficiency and that's one of the key reasons for which big data experts and data scientists belong to the highly paid and highly coveted group in the IT landscape. Training existing staff or hiring experts to handle big data can easily increase the cost of a business considerably.

V. Characteristics of big data:

1. Big Data Volume:

Characteristic is the immense Volume of data which is larger than the data that is processed in a normal enterprise system, which leads to newly designed systems. Reason for the immense amount of data is different developments. One reason for the Big Data amount is that, the data of different IT systems are merged with what multiplies the amount of data.

2. Veracity and truthfulness of data:

The ingestion and the processing data of different systems leads to Veracity challenges about the accuracy of data and is another key characteristic of Big Data. Imagine there are different records showing the same data and they differ in the date timestamp. Alternatively, data might be incomplete and one does not know that the records are incomplete and there was a system error. Hence, Big Data Systems need concepts, tools and methods to overcome the veracity challenge.

3. Variety of data types and data sources:

In addition to the different source systems, Data which were not logged and overridden before can be stored in Big Data scenarios. Such data are like change histories, record updates and the likes which can enable new use cases like Time Series Analytics which are not possible on old overridden data. There are new data sources which produce immense amounts of data. Most simplistic versions of these are social media data or data from smart phone apps which produces new insights of customer interactions. Characteristic in call cases is that the Variety in these data is very different from another; It is from unstructured social media text data to structured operative enterprise system data. The variety can go over Time Series commit logs, computable financial time series data, and end up in app usage- and semi-structured customer interaction data. Big Data landscapes and systems face the challenge to handle this different data and to enable users to merge it together, where it makes sense.

4. Velocity challenges:

Aside all of the prior mentioned data sources, IoT data is continuously increasing and future business models of enterprises are depending on IoT data. IoT data and new data sources like social media, consumer apps, Time Series Data and increasing data in the supply chain are generating a increasing speed in data generation. Data generation cannot be solely seen as static

records in a database anymore and a new viewpoint of data as continuous stream is necessary. This leads to new questions of data storage, but also in computation and reaction to events in the data streams. Batch processing that is sufficient for a large volume of data does not copy anymore with an increasing Velocity. Therefore, modern Big Data Analytics Landscapes need to be able to store fast data quickly, but to also execute computations and movements of data in an efficient way.

VI. Why big data?

Just like the entire universe in our galaxy is said to have formed due to big bang explosion similarly data has also been being going exponentially which is leading to explosion of data. So this can simply be called as big data and you know that creating about 2.5 quintillions bytes of data every. So you can imagine the amount of data we are creating everyday and this data is created on various sources and platforms like social media, from banking sectors, governments and other institutions. This data is not in the same format as it is coming from various sources it is in various formats

VII. Types of data

- **Structured data:**

Structured data is basically in the form of relational data in the format of table's i.e. rows and columns.

- **Unstructured data:**

Unstructured data is in the form of audio files video files images etc.

- **Semi structural data:**

Semi structural data is in form of xml files etc.

VIII. What is big data analytics?

Big data analytics examines large and different types of data to uncover hidden patterns correlations and other insights. Help large company to facilitate growth and develop .help in data mining .and in making decisions.

- **Objectives**

The paper was guided by the following specific objectives 1. To highlight the attributes of big data that are relevant to educational institutions 2. Investigate the factors influencing adoption of big data and analytics in learning institutions 3. Establish the factors limiting adoption and use of big data by Institutions of higher learning.

- **Literature Survey**

Now-a-days students are forced more on process of learning but David Nicol in his article states the importance of formative assessment and feedback which can address a wide continuum like motivational, communicative and intellectual aspects of self-regulation[1].Educational data is hierarchical. Techniques for hierarchical data mining and longitudinal data modeling is the main expansions in mining educational data[2]. There are many benefits of Big Data and open data in educational sector. It helps parents and students to find the best educational program, transparent education financing and matching student and employment. A thanasios Drigas and Panagiotis Leliopoulos also briefed the usage of Data Analytics with Big Data in Industry [3].

- **Methodology**

This is a descriptive research methodology. Here different research papers, case studies, articles and some websites are referring for the research of Big Data to education.

- **Discussion**

This paper has explored Big Data Analytics and its relevance in Educational systems with a view

of helping educational institutions adopt Big Data Analytics. The paper has explored the attributes of big data that are relevant to educational institutions, the factors influencing adoption of big data and analytics in educational institutions and looked at the factors hindering use of big data in these Institutions. Big Data is far more than simply collecting information and generating reports. It is a strategic resource that can be used to improve educational quality. This paper recommends that educational institutions, particularly in developing countries be encouraged to make investments in analytics programs and in developing expertise in order to get value of big data. Big Data helps to cut costs and improve education by enabling administrators make decisions that are more specific and affords teachers valuable tools to choose from for a variety of learning. The Big Data approach to data management will help reduce difficulties associated with traditional data analysis; and this has the potential of enriching the education system with new learning ways, and making decision making by policy makers more efficient and targeted.

IX. Applications :

1. Enhancing Student Results
2. A better Grading System
3. Gaining Attention
4. Customized Programs

X. Conclusion:

Big data analytics applications in education have revolutionized the sector. Educational institutions are using big data analytics to screen applicants, deciding who will be a good fit for the institutions are using Big Data to screen applicants, deciding who will be a good fit for the institute and the once who might not make it.This has helped institutions all over the world to reduce the time spent on the selection process. Big Data is also being used while recruiting teachers.

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[4]https://www.semanticscholar.org/paper/Big-data-in-the-Education-Sector%3A-Needs%2C-Anirban/20b9df03dce391a8c4d5f084d7d38e8852e0221a

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Gamification

Devendra Sandipkumar Rathi, MCA-II, DYPIMR

Dr. Shraddha Dudhani, Asst. Prof. , DYPIMR

ABSTRACT:-

At heart, gamification is a powerful tool for catalyzing attention, focus and investment. What parent ever resisted gamifying the process of getting a group of kids to the car by announcing that it was a race? Gamification transfers the mode, value and incentive of game play to a separate experience like buying groceries, visiting web sites, or even learning. By borrowing the intrinsically rewarding elements of game play; rules, victory conditions, rewards, punishments, status, stakes and personally vested narrative other endeavors can find fresh appeal with stakeholders and increase the likelihood adoption. As the core concept of marketing is the association of two appealing, but dissimilar ideas; motorcycles and prestige, cereal and athleticism – so too, gamification can be applied to associate fun with learning. In essence, the student is hooked by the idea of the game, pulled forward by curiosity to learn more or win, and ends up enjoying the experience, becoming engaged in the idea or activity and opening themselves up to the possibility of learning.

KEYWORDS:

1) Contemporary Gamification
2) Gamification in Marketing
3) Potential Applications

Introduction:-

Games create engagement – a necessity for any learning experience (Gogos, 2012) Gamification is the process of adapting an experience like purchasing bread, mastering a handwriting recognition program or learning math with game-like elements. A 2012 survey conducted by the Entertainment Software Association showed that the age demographic of game players in the U.S. is split in almost equal thirds with people ages 18-35 representing 31% of gamers. (New Horizon Report, 2013). Popular culture has adopted the metaphor of games as a mode of simulating experience and practicing skill acquisition. Digital gaming is now pursued by a majority of the first world population. The age range of gamers gets younger every year while veteran gamers continue to play well beyond childhood. As tablets and smartphones

have proliferated, desktop and laptop computers, television sets, and game consoles are no longer the only way to connect with competitor's online, making game-play a portable activity that can happen in a diverse array of settings. Game play has traversed the realm of recreation and has infiltrated the worlds of commerce, productivity, and education, proving to be a useful training and motivation tool. While a growing number of educational institutions and programs are experimenting with game-play, there has also been increased attention surrounding gamification — the integration of game elements, mechanics, and frameworks into non-game situations and scenarios. (New Horizon Report, 2013) The question remains, how and to what degree gamification can be used as one tool among many to catalyze learning engagement while improving knowledge retention and skill acquisition among disenfranchised learners. Businesses have largely embraced gamification to design work incentive programs and mobile apps that engage employees through rewards, leader boards, and badges. Although still in its nascent stages, the gamification of education is gaining further support among researchers and educators who recognize that games stimulate productivity and creative inquiry among learners. (New Horizon Report, 2013). The primary value provided by gamification is heightened, voluntary and enjoyable engagement. This engagement not only attracts new customers, but can result in both habit and culture which encourage repeat use and return customers. Once drawn into the fun of the game, the amount of time spent around the brand increases as does the opportunity for purchase and emerging brand loyalty. Advancements in mobile technology further expand opportunities for game- play, allowing participants to engage any time from any place. Anyone who owns a smartphone or tablet can become a gamer. Free mobile games abound, and the most popular have become widely used outlets for social interaction and connecting family and friends, such as "Words with Friends" — a modern take on Scrabble. Social networking features of mobile games support the prevalence of game play in a culture that is increasingly concerned with staying in touch and being connected all of the time; in this sense, the appeal of online games is not just about who is playing, but who in one's personal network is playing. (New Horizon Report, 2013). This ubiquitous existence of available gaming screens opens up new time frames for engagement. Where once learning happened during "school hours" and advertising was consumed in the morning paper or evening television

– now messages can be received and content delivered at virtually all hours, locations and walks of life. When the concept of gamification is applied to

education, the opportunities for experiential, selfpaced and lifelong learning expand exponentially. Learners are hooked by fun and then rewarded with knowledge and skills.

Contemporary Gamification:- According to the Utendorf August 13, 2013 article on IntrepidLearning.com, Gamification is the process of using gaming methods and mechanics in a non-gaming environment to motivate customers and employees. According to Gabe Zicherman in his textbook Gamification by Design Gamification is "the process of game-thinking and game mechanics to engage users and solve problems" It's not about developing full-on games, but rather it's about using gaming attributes to drive engagement, strengthen skills, or behavior changes. (Utendorf, 2013) Learning is not made into a game; the features of games (curiosity, collecting, exploration, and domination to name a few) which entice players to engage are used to draw in learners. Consumer-facing businesses use gamification to drive revenue and consumer engagement through loyalty cards, referral discounts, and social media.

Gamification is also rapidly becoming an important strategy for all kinds of organizations to drive employee engagement and loyalty. Human resources and L&D teams, in particular, can leverage gamification in a variety of ways, including:

- Increasing participation in employee satisfaction surveys
- Motivating users to complete mandatory and optional training
- Inspiring workers to join incorporate wellness programs
- Encouraging positive adoption of change management projects There is excitement about applying these heightened engagements among employees, customers, patients and management students in education; reluctant or compulsory students in particular. Any tool which can catalyze curiosity from an inert learner will increase potential skill and concept acquisition.

Gamification in Marketing:-

By 2015, more than 50 percent of organizations that manage innovation processes will gamify those processes, according to Gartner, Inc. By 2014, a gamified service for consumer goods marketing and customer retention will become as important as Facebook, eBay or Amazon, and more than 70 percent of Global 2000 organizations will have at least one gamified application. (Goasduff, Laurence, Christy Pettey, and Brian Burke, 2011) This not only opens up the potential for consumer level game development tools, but normalizes the method and mode of game based learning engagement. By normalizing games they begin to lose the taboo of the early 1980s

which is that they are for introverts and malcontents. "Gamification describes the broad trend of employing game mechanics to non-game environments such as innovation, marketing, training, employee performance, health and social change," said Brian Burke, an analyst at Gartner. "Enterprise architects, CIOs and IT planners must be aware of, and lead, the business trend of gamification, educate their business counterparts and collaborate in the evaluation of opportunities within the organization." (Goasduff, Laurence, Christy Pettey, and Brian Burke, 2011). Business tends to mirror the practices of politics and modern education takes their cue from business as more and more educational institutions wake up to the reality of their fiscal responsibility as an institution. Criticism has been levied at the slipshod application of Gamification by some consultants, and poorly thought out marketing campaigns. According to game theory experts, authentic gamification requires careful marketing crafting and execution with respect to the genuine characteristics of true games. The simple addition of point systems and badges to an experience does not make it game or take the place of meaningful interactions, sincere challenges and incentive to exceed ones comfort zone. This sentiment was hotly expressed at the Wharton conference, Georgia Institute of Technology professor and game designer Ian Bogost called gamification efforts "exploitation-ware" that is being "invented by consultants as a means to capture the wild, coveted beast that is video games and to domesticate it for use in the grey, hopeless wasteland of big business." Gamification, he argued, "gets games wrong, mistaking incidental properties like points and levels for primary features like interactions with behavioral complexity." In the GDC 2011 gamification debate, he states that "To take something like games, which are complicated, and substitute it out for points and badges is a very efficient way to get a hot culture commodity into your product".

The most logical starting point for the gamification of education is in the context of online course delivery. The technology, interface, expectations and familiar metaphors are all in place for an optimally smooth transition from text farming to gamified engagement. The New Media Consortium's 2013 Horizon report shares the following: In the context of higher education, when students are expected to think critically in order to solve problems, game- like simulations can be leveraged in any discipline to reinforce the real world applications of concepts. At the IE Business School in Madrid, for example, students are learning the complexities of global economic policy through a game called "10 Downing Street" (go.nmc.org/street). In this

simulation, students take on the role of the British prime minister and work with key figures including Paul Krugman, Margaret Thatcher, and Milton Friedman to come to an agreement that will affect the wellbeing of the national economy. In teams of six, students engage in debates to determine the most viable policy option, which is then put into practice after a general election. Scenarios like this one demonstrate the power of games to mimic pressing issues, requiring students to do higher-level thinking and exercise skills pertinent to their area of study. (NMC, 2013) Hybrid classrooms and purely brick and mortal educational delivery models can both leverage the concept of gamification to enhance engagement and improve content comprehension. While contemporary views of gaming are focused on digital video games, the [non-digital] game of Mancala was spread in part through the movements of the soldiers of the Roman Empire. Many Roman period Mancala boards are graffiti type boards, that is to saythe rows of cup indentations were carved into the steps of the theatre at Palmyra; others are found in house floors and temple walls as documented in a recent survey. Others have been found in Ephesos and northern Egypt; largely adhering to the boundaries of the Roman Empire. (Hirst, 2013) Enterprising legionnaires could have leveraged the stone and pit based game

into a training exercise had that idea been more in keeping with the zeitgeist.

At the most basic level, there is particular skill content which lends themselves to specific types of games. As with the application of gamification itself, care must be used when borrowing an idea from one field and adapting it to another. Early learning games simply showed the student digital flashcards, failing to adapt the experience to the new medium and completely missing the opportunity to gamify the experience itself. Below is a table of game to content relationships intended for K-12 students, but applicable to any learner at the beginning of their course of study.

Potential Applications:-

As hotly postulated by Ian Bogost and echoed by Bartle in the succeeding paragraphs, the application of gamification must be done with a deep understanding of game mechanics and a clear grasp of gamer motivation. According to Bartle there are four basic categories of gamer, arranged here to for the acronym SAKE for easy recall. Socializers are often more interested in having relations with the other players than playing the game itself. They help to spread knowledge and a human feel, and are often involved in the community aspect of the game (by means of

managing guilds or role-playing, for

instance). Achievers are competitive and enjoy

beating difficult challenges whether they are set by the game or by themselves. The more challenging the goal, the most rewarded they tend to feel. Killers like to provoke and cause drama and/or impose them over other players in the scope provided by the virtual world.

Trolls, hackers, cheaters, and attention farmers belong in this category, along with the most ferocious and skillful PvP (player versus player) opponents. Explorers like to explore the world – not just its geography but also the finer details of the game mechanics. These players may end up knowing how the game works and behave better than the game creators themselves. They know all the mechanics, short-cuts, tricks, and glitches that there are to know in the game and thrive on discovering more.

Similar to Bogost, Bartle calls it [Gamification] a bandwagon. A designer reads the summary; "four types of player? Okay, let's roll with that." They don't know why or how, but still they try to slap the theory on a non-MUD (or even non-game) activity. This is how you end up with, for example, a shoe selling website that grants you points each time you buy a pair of shoes. With a certain amount of points, you get the access to a specific pair of shoes you can only buy thanks to the points you collected. So far it sounds good – it's viable and works for achievers. Nevertheless, consider an explorer who is visiting every part of the website.

Imagine he gets points for it. These points are worthless to them – rather, you should reward them with a way to keep on exploring the site; they'll thank you by continuing to play (i.e. interact) and enjoy the site. In the same way, a leaderboard won't necessary sit well with a socializer. He's not interested in rankings, he's more interested in meeting and getting to chat with and know more people. (Bartle, 2013). Like Bogost, Bartle cry of dismay is not against gamification, but a plea to take it farther; to its logical and complete application.

Another feature of games universities are experimenting with is badging, a system of recognition that allows students to accumulate documentation of their skills, achievements, qualities, and interests in a visual public- facing format. Launched in September 2011, Mozilla Foundation's Open Badges project (go.nmc.org/badges) is a free online platform for designing and collecting badges in portfolios that can be viewed by peers, professors, and potential employers. Mozilla's Open Badges has sparked considerable discussion about how to recognize informal learning experiences, especially those that cannot typically be

conveyed through credit hours or grade point average. (NMC, 2013) Badging appeals most strongly to the combination of Achiever and Socializer Bartle type; the achiever has earned a visible rank of distinction which they personally value whereas the socializer now has a visual

symbol they can show off to their peers and even use as a jumping off point for further socialization, discussion the badges acquisition or joining a group of similarly ranked players.

Conclusion:-

While the term Gamification has fallen under some scrutiny in recent media, theconcepts, ideas and applications behind it appear to be gaining traction. As educators continue to explore better and more effective ways to engage a wider audience of learners in a broader context of environments, the adoption of gamification methods will continue to offer quicker and more effective catalyzing tools than traditional sage on stage instruction. As consumers and businesses embrace the Internet, strategies of e-commerce applications and processes need to be constantly reassessed. Many Internet retailers overlooked the importance of supply.

REFERNCES:-

1. Journals:-
   - E-Learning and Digital Media is a peer-reviewed international journal directed towards the study and research of e-learning in its diverse aspects: pedagogical, curricular, sociological, economic, philosophical and political.

3. Web materials:-
   - A Good Game for Learning About Nutrition Around the World
   - A Handful of Games for Fun Typing Practice
   - Two Games That Illustrate the Dangers of Distracted Driving

"To Study Impact of Agriculture Mobile Applications and Web Applications on Farmers in Maharashtra"

Mr. Uday S. Kore [1], MBA, DYPIMR
Dr. Jena Joshi [2], Asst. Professor, DYPIMR

ABSTRACT

This research primarily deals with the study to show the impact of agricultural application and web application on farmers. The research has taken place in various areas in Maharashtra. The purpose of the study to show the impact of agriculture application and web application on farmers. It was an experimental research study that studied farmers knowledge by different secondary sources. Also Questionnaire (direct, structured) method and observation method of research is used for study purpose.

Farming is growing crops or keeping animals by people for food and raw materials. Farming is a part of agriculture. Many people still live by subsistence agriculture, on a small farm. They can only grow enough food to feed the farmer, his family, and his animals.

KEYWORDS: Web Application, Farmers, Agriculture.

INTRODUCTION

Mobile phone usage in third world countries is playing a vital role for the enhancement of farmers business towards agriculture. Recently, communication through mobile phones is considered very important in enhancing farmers' access to better understand agricultural market situation. Farming communities appreciate mobile phone as easy, fast and convenient way to communicate and get prompt answers of respective problems. Nowadays, the mobile phone has generated an opportunity for the farmers especially to get the information about marketing and weather. Through this important technology, they directly keep in touch with market personals and offer their produce with reasonable prices. The use of mobile phone also keep them aware for weather forecast for agriculture input application like fertilizer and pesticides which might be affected by unforeseen seen disasters as communicated by meteorological department.

Technology today is present in all parts of our lives, and it is widely available to everyone. The main forms of technology in industry, farming and household are communication and mobile technology. More than 5,6 billion of people use mobile phones, nearly 80% of world's population. Almost 94% of farmers use mobile phones, especially in developing countries, where mobile phones may be the only available widespread computing and communication technology. This number leads us to the conclusion that we have the ability to

use mobile technology to help farmers improve their agricultural production.

Smartphones and it applications has come with great innovations. The applications have been developed to help farmers reduce stress, acquire relevant information on good agriculture practices, weather, quality input, markets tendency, etc. Through social media, web sites and other applications, farmers can improve their skills, share experiences and even sale their products online using their smartphones. Smartphones and their applications are innovations bringing good solution for agriculture development in other to help farmers to have access to relevant information.

In the field of farming, the advancement in technology brought many improvements in the facilities used in farming. One of the most dramatic changes in the use of mobile devices in agriculture is the development of monitoring protocols and systems for monitoring and managing farms and farm workers.

Top 10 Apps Revolutionizing Indian Agriculture:

1. Kisan Suvidha
2. IFFCO Kisan Agriculture
3. RML Farmer – Krishi Mitr
4. Pusa Krishi
5. AgriApp
6. Kheti-Badi
7. Whats App
8. Krishi Gyan
9. Crop Insurance
10. AgriMarket

LITERATURE SURVEY

1. Manish Mahant, Abhishek Shukla, Sunil Dixit, Dileshwer Patel, (2012)

The application of Information and Communication Technology (ICT) in agriculture is increasingly important. E-Agriculture involves the conceptualization, design, development, evaluation and application of innovative ways to use information and communication technologies (ICT) in rural domain, with a primary focus on agriculture. Information and Communication Technology (ICT) can play a significant role in maintaining properties of information as it consists of three main technologies. These technologies are applied for processing, exchanging and managing data, information and knowledge.

2. Ugwuishiwu C.H., Udanor C.N., Ugwuishiwu B.O., (2012)

This paper proposes an Agro-Information System that enables a farmer to have relevant information about a crop, such as the varieties and other requirements like soil type, temperature, type and quantity of fertilizer, time of planting, time of maturity, planting distance, diseases, pest, pest and Disease control measures, rainfall, sunshine, etc. of that crop.

The level of application of this information determines the volume and efficiency of the crop yield. AIS software is designed and implemented which helps the farmer achieve the afore-mentioned objectives.

RESEARCH METHODOLOGY

The research involves descriptive research design. Primary data is collected through questionnaire and interview method. The sample size is 100. Data analysis is done with the tools including pie chart, bar chart through percentage method.

DATA ANALYSIS AND INTERPRETATION

1.What is your Occupation?

- Farmer
- Student
- Businessmen
- Job

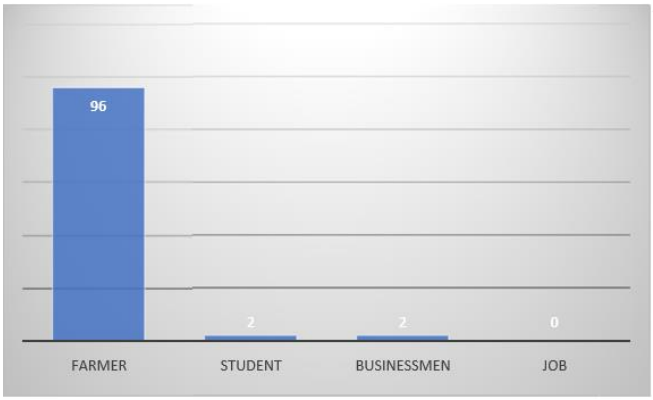

Figure1: Occupation of the respondents

As per figure 1, by profession number of farmers are 96 and students are 2 and businessmen 2.

2. Do you use mobile phone ?

- Yes
- No

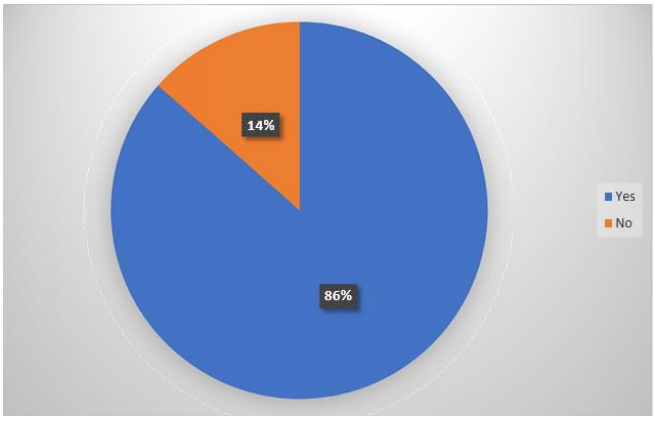

Figure 2:Use of mobile phones

As per **Figure 2,** from the total number of sample mobile users are 86 percent i.e. 86. It means that there is popularity in the use of mobile phones.

3. Do you feel that use of mobile is important?

- Strongly Agree
- Agree
- Neither Agree Nor Disagree
- Disagree
- Strongly Disagree

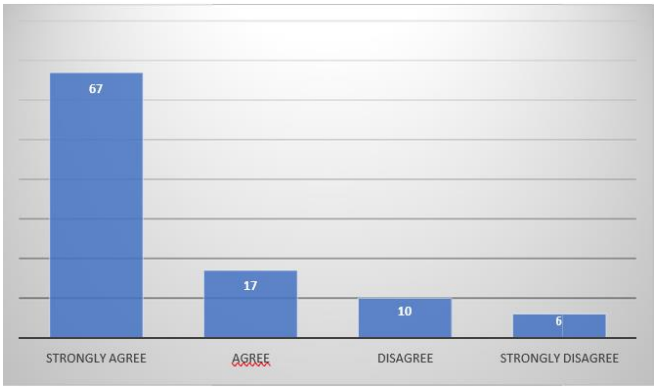

Figure 3:Importance of use of mobile phones

From the sample people who feel use of mobile phone is important are 67% people are strongly agree respectively 17% people are agree and 10% are disagree on the statement and 6% people are strongly disagree.

4. Which type of mobile do you use?

- Android by Google
- iOS by Apple
- KaiOS by Jio
- Other

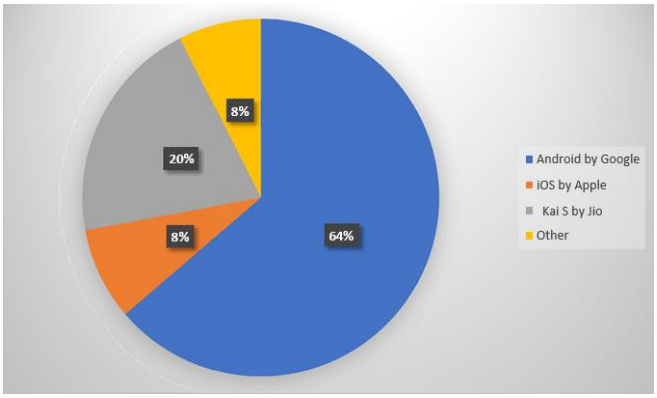

Figure 4: Type of mobile phone used by respondents

There are several mobiles in the market form them, sample population has selects several phone such as 64% people are android users, 8% users of iOS, 20% users from KaiOS, and other are 8%.

5. Do you use your mobile for agriculture purpose?

- Yes
- No

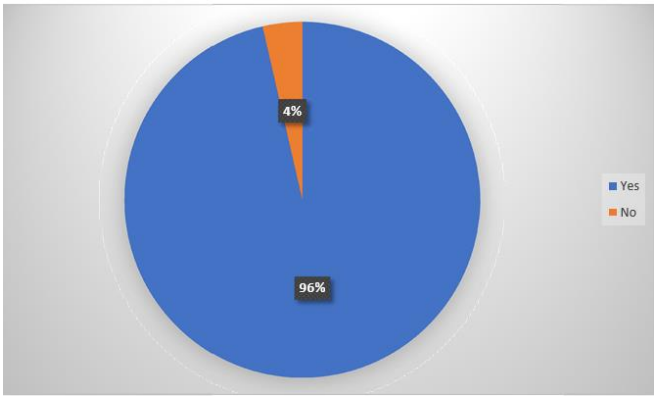

Figure 5:Use of mobile for agricultural purpose

As per the following pie chart 96% people use mobile phone for agriculture purpose and 4% do not use phones for agriculture. Above data calculated form the users who are farmers.

6. Why do you use your mobile for agriculture purpose?

- Kisan Call Center
- Farm Cunsulting
- Agriculture Knowledge
- Government Scheme
- Krishi Vigyan Kendra
- Other

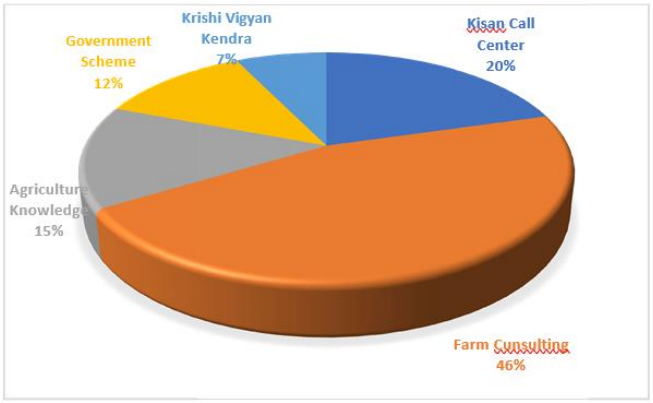

Figure 6:Reason for use of mobile phones for agricultural purpose

There are several ways to use mobile phones to agriculture purpose but as per given pie people are using them as a different agriculture use such as 46% people use for farm consulting, 15% people use for agriculture knowledge, 12% people use for government scheme, 7% people use for Krishi Vigyan Kendra, 20% people use for kisan call center. These data is variable such all population may use for all purposes.

7. Do you know about mobile applications and web applications?

- Yes
- No

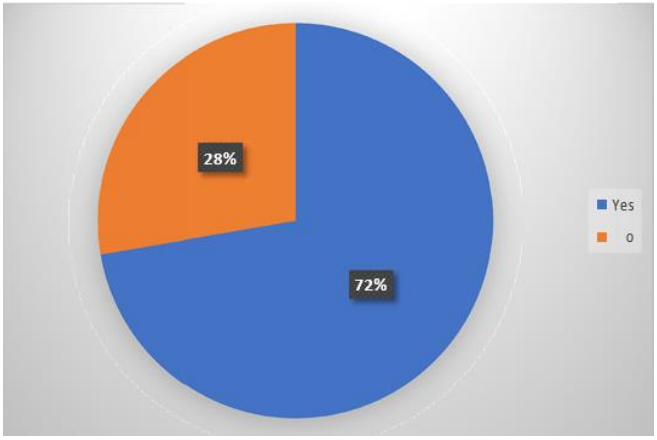

Figure 7: Awareness about mobile and web applications

According to Fig 7, 72% people know about the mobile applications and web applications and 28% don't. The awareness in the farmers about applications is good.

8. Do you use agricultural / farming applications?

- Yes
- No

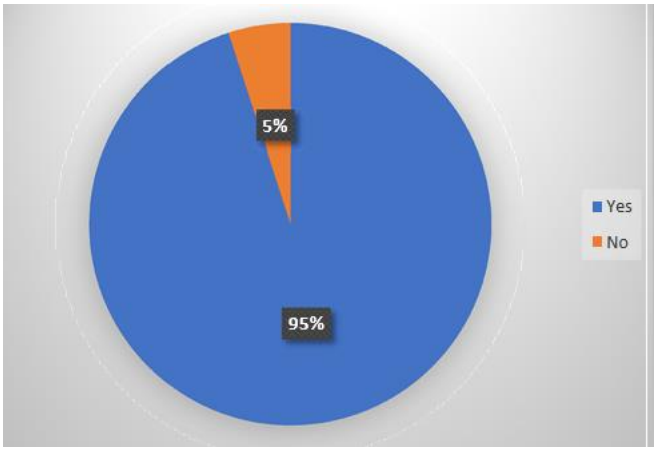

Figure 8: Use of farming applications

Agriculture farming applications are important for the people. The population of 95% people use agriculture/farming applications in there phones and 5% people don't.

9. Do you feel that use of mobile applications and web applications is important?

- Strongly Agree
- Agree
- Neither Agree Nor Disagree
- Disagree
- Strongly Disagree

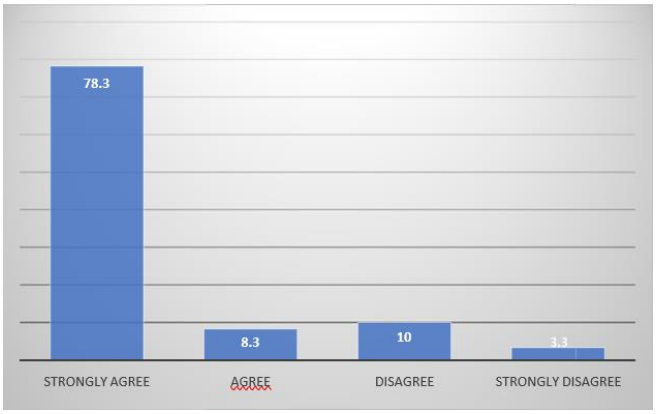

Figure 9: Importance of mobile and web application among respondents

From the fig 9, people who feel use of mobile applications and web applications is important are 78% people are strongly agree respectively 8% people are agree and 10% are disagree on the statement and 3% people are strongly disagree.

10. Why do you use agricultural / farming applications and web applications?

- Government Scheme
- Agriculture News/Magazine/Articles/Books
- Farming Guidance
- Knowledge purpuse
- Other

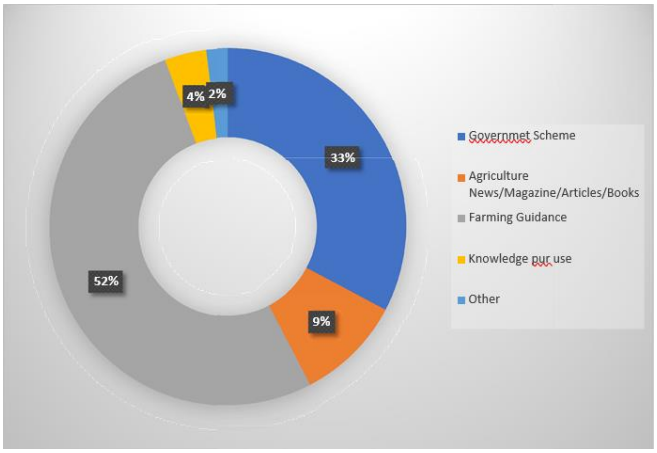

Figure 10: Reason for using agricultural / farming application

There are several ways to use mobile applications and web applications to agriculture purpose but as per given pie people are using them as a different agriculture use such as 33% people use for Government Scheme, 9% people use for Agriculture News/Magazine/Articles/Books, 51% people use for Farming Guidance, 8% people use for Knowledge purpose, 2% people use for other applications. These data is variable such all population may use for all purposes.

RESULTS

- Farmers are very conscious about new technology such as in Web applications and mobile applications
- The major conclusion of study was the impact of the Internet on farm

management is very important.

- The conclusion of our survey is that, through the Internet, the farmer's office is/will be connected to those of his advisers, of his commercial partners, etc.
- Through the web sites, e.g. offices of co-operatives are becoming neighbors to those of all farmers.
- WWW technology is expanding rapidly and touches almost all areas of human activity.
- It is therefore essential that farmers can participate in the creation of web sites for their farms.
- Agricultural universities must prepare not only students to use new IT, but must also help farmers in better use of the web by different means, eg, extension services, and creating new specific web sites.
- Smartphone technology is promising for the future development of agriculture, as it can facilitate and improve many operational procedures and can also be combined with precision agriculture technologies.

CONCLUSION

- Agriculture supplies food, clothing, medicine and employment all over the world. It provides food security to the human population.
- The trend is growing. Support for the agriculture sector is increasing. The list of reasons is endless. Attitudes toward agriculture are already changing. Young people are also increasingly speaking up for themselves on why they choose agriculture.
- Today, more than before, climate change and a growing demand for nutritious food are for fresh ideas and renewed knowledge to explore ICT in agriculture, foster climate-smart agriculture and innovate in the sector to power future growth.
- In Maharashtra where there are enough land resources, the young entrepreneur should be encouraged to agriculture as an untapped resource of development.
- Agriculture is highly dependent on land, which is incredibly politicized, which in turn makes agriculture or farming unattractive especially for youth without the political connections or financial capital.
- Agriculture has enormous potential for eradicating poverty, needs youthful energy and passionate team players.

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Fifth Generation (5G)Wireless Networks: A Comprehensive Report

Harsh Kumar, MCA-II, DYPIMR

Mrs. Priya Joshi , Asst. Prof., DYPIMR

ABSTRACT

The major vision of next generation 5G wireless communications is to deliver higher multi-Gbps peak data speeds, ultra-low latency, more reliability, massive network capacity, increased availability, and a more uniform user experience to more users compared to current 4G LTE networks. 5G enables us a new kind of network that is designed to connect everyone and everything together including machines, objects, and devices virtually.5G wireless technology is to give higher performance and improved efficiency encourage new user experiences and connects new industries. Today, the most demanded thing in 5G development is the design of flexible system concepts and the platform that allows us successful integration and management of various distinct technologies.

Keywords: 5G, Evolution from 1G to 5G, 5G Architecture, Impact of 5G

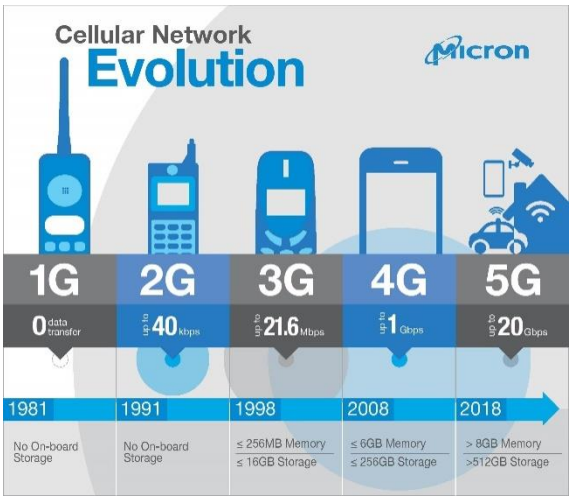
INTRODUCTION

It has been more than 40 years since mobile wireless communications were started with the first generation which was only voice-only systems. But from the last couple of decades the world has seen the steady evolution of mobile wireless communications towards second, third and fourth generation of wireless networks. Each generation of wireless networks has significantly changed our world. In 1980s, 1G was launched in Japan by Nippon Telegraph and Telephone (NTT) which brought us the brick phone utilising analogue technology in the 80s. It was also the first time when phones became truly mobile, albeit being bulky and expensive, and limited to voice features.

Later in the 1990s, 2G brought us digital handsets that provide the services such as text messages, picture messages, and MMS which made communication on-the-go possible. Phone sizes and prices reduced and the adoption of the mobile phones grew, although it was mostly for business and professional use.

In the early 2000s, 3G brought everyone online with mobile broadband integrating voice, video and high-speed data. 3G became popular not only in adults but also in teens to use mobile phones. 3G primary benefits over 2G networks like digitally encrypted phone conversations, at least between the mobile phone and the cellular base station but not necessarily in the rest of the network.

The decade from 2010 to 2020 has been well characterised by the use of 4G, which has significantly increased the speed and capacity of cellular networks. It has given rise to an entirely new generation of applications, which fundamentally changed how we do business and communicate. The rise of ride-sharing services, live-streaming videos, and a host of other applications were all possible due to 4G LTE Services. Entire industries such as the vast economy were created as a result of 4G. During this 2020 pandemic, 4G has made remote learning and telemedicine a reality.



Source: https://www.eetimes.com/5g-needs-more-memory-to-compute/

As we look forward to the present decade from 2020 onwards, 5G is most trending technology. The race of 5G is not about deploying new infrastructure, but also getting the first mover advantage in who can build and take the leadership role in the host of new applications and services that 5G will enables. It is the race that has captured the minds of all – from nation-states to entrepreneurs.5G provides improvements in many ways – up to 10x faster than 4G, 10 times lower latency than 4G, 100 times more devices than 4G, and to 90% lower energy consumption compared to 4G.

New technologies that will be required to work in with 5G for rollout to be successful:

- **Millimetre-wave:** This is a new band of spectrum being opened only for 5G in which frequency ranges from 6GHz to all the way up to 300GHz. It has a higher frequency spectrum that can drive higher capacity as well as higher bandwidth.

Source: https://www.researchgate.net/figure/A-general-5G-cellular-network-architecture_fig19_280873356

- **Massive MIMO:**MIMO means multiple input, multiple output and refers to the antenna technology that is utilised to drive better coverage. The higher frequency bands provide an advantage in that as they require smaller antennas. MIMO makes it feasible to pack more antennas on a base station which in turn drives much higher capacity. 5G can contain around 256 antennas per base station, significantly higher than the dozen or so in 4G.

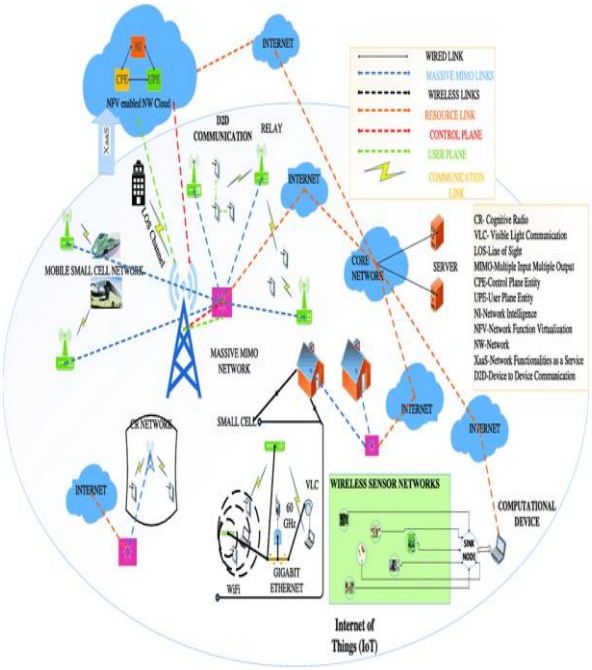
- **Small cells and beam-forming:** Higher frequencies lead to higher propagation loss. The higher density of MIMO antennas can also increases signal interference. The goal in 5G is to develop smaller cells that would then be served by the high-density MIMO antennas. The small cell size addresses the issues around propagation loss. At that moment the beam forming technology allows the 5G signals to minimise interference by selectively targeting devices.

- **Network slicing:** 5G will support network slicing that has the ability to divide single network connections into multiple distinct virtual connections.

- **Mobile edge computing:** This is the key to reduce end-to-end latency of applications. With the Mobile edge computing the applications can run in data centres closer to the 5G network, thereby it will significantly reduce the end-to-end latency of applications.
- **Control and user plane separation (CUPS)-** By separating the user data from the control plane processing, user plane traffic can be switched locally without having to backhaul traffic, thereby lowering latency and increasing throughput.

This journey to 5G will require extra careful planning both on the network

operator side and the companies leveraging and building applications over a



5G infrastructure.

Collaborative Research and Global Agreements

- **Ericsson, Alcatel bright,** and **Nokia** put together launch the business development cluster 5G-PPP within the year 2014. The 5G Infrastructure Public-Private Partnership was initiated by the European Union to partner with personal sector corporations.
  Different business members are primarily European telecommunications corporations, and embrace European analysis subsidiaries of **DOCOMO** and **Huawei.**

- In China, 5G analysis and development is being sponsored by 3 ministries that together established the **IMT-2020 (5G) Promotion cluster**. The objectives of **IMT-2020** embody developing 5G technologies for China and facilitating cooperation with foreign firms.

- In South Korea, the 5G Forum is started by **SK Telecom,** to compete with cooperative efforts in Japan, Europe, and China, the mission of the 5G Forum is to achieve global leadership for Korea in 5G technologies. Collaborating committee members include **Samsung, LG Electronics, and Ericsson-LG, other corporate members include Intel and Qualcomm**.

- In **India, JIO and Qualcomm joins hand** to develop 5G solutions and accelerate the efforts to bring the high-speed network to the world's no. 2 mobile market by users.

Transforming User Experiences in 5G using Devices

Over 1.5 billion 5G-capable Smartphone devices no doubt to be in user's hand by 2024. The particular device technology, the user experience on a range of devices, like Smartphone's, smart TVs, Augmented Reality (AR) and Virtual Reality (VR) headsets, PCs and wearables, are essentially reworked by the 5G rollout, that is started in 2019. 5G will be way quicker speeds, extreme lower latency and much quicker for devices – particularly for high bandwidth applications. As a result, due to 5G, current use cases on devices can well improve and, at identical time, utterly new use cases will be created.

- **Immersive AR and VR anytime, anywhere**

  Augmented Reality and Virtual Reality are the two transformative technologies which is set to revolutionize the consumption of content for both consumers and businesses from gaming and videos to education and training. However, both AR and VR are very compute-intensive tasks with the abundant amounts of data needing to be shifted from devices to the cloud.

This data transfer of large sets presents latency and speed problems when using AR and VR on devices. AR and VR applications can be very sensitive to network performance and connectivity issues while any minor disruption will destroy the overall user experience. Both the technologies require an efficient, and sizeable, increase in network capacity. Fortunately, 5G will provide the speed, bandwidth and latency requirements to improve both the user experience. The high-speed 5G internet connection between the cloud and the device will enable fast and immersive AR and VR with uncompromised quality of experience. For full AR and VR immersion, the 5G-enabled ultra-low latency down to 1 ms which is critical. Meanwhile, 5G-enabled improves the video through new 8K and 360° viewing experiences and mobile gaming through immersive 4K gaming will support the development of AR and VR.

- **Dynamic mobile gaming 'on-the-go'**

Mobile gaming is set to become the more dynamic due to 5G rollout. Before 4G, the popularity of mobile gaming has never been higher. According to the Newzoo, a market intelligence agency, 2018 was the year when revenues from mobile gaming passes the revenues of console and PC-based gaming for the very first time, revenue to more than half of gaming revenues worldwide ($70.3 billion). The high growth is being enabled by mobile gaming moving towards very popular high-fidelity, multiuser games, such as Fortnite and PUBG. The extreme fast connectivity of 5G will offer more responsive and immersive 4K mobile gaming experience at unbelievable 90 fps, representing a significant step-up from 4G. This 5G technology will allow users to remain connected to their compute intensive, high-fidelity games 'on-the-go'.

Suggested 5G Wireless Performance	
Parameter	Suggested Performance
Network capacity	10 000 times capacity of current network
Peak data rate	10 Gbps
Cell edge data rate	100 Mbps
Latency	< 1 ms

- **Video streaming experience and viewing on mobile**

According to an **Ericsson Consumer & IndustryLab Insight Report** from May 2019, Smartphone users estimate that in the next five years they will consume three hours video weekly on their mobile devices staying away from home, with one hour of this predicted to be on AR/VR smart glasses.

- **Advanced viewing experiences**

Consumers around world are already enthusiastically purchasing devices with 4K viewing experiences and 8K TV's set to be available soon. However, 8K video will use data rates of over 100 Mbps which will lead to a six times increase in demand for bandwidth with 5G services helping to manage these high bandwidth demands. Without 5G, 8K video will either not be possible or too slow to process. Content streaming services will also boosted from 5G due to the far higher speeds and improved latency. In fact, an Ericsson Consumer & IndustryLab Insight Report flags a potential trend of the 5G rollout leading to consumers transitioning from cable TV to 5G streaming services.

- **Constant connectivity: no more Wi-Fi?**

The greater connectivity enabled by 5G will be a 'game-changer' for users. According to an ARM commissioned report from Creative Strategies, 23% of consumers note connectivity as a top three feature for their next laptop, yet only six percent claim to own a laptop with a 4G modem. A key feature of the Window on Arm PC devices is the ability to stay

'always connected' through its LTE modem, which would be replicated and then expanded to 5G.

- **24*7 health advices and monitoring with smart health cares**

  The value of the smart home healthcare market is expected to hit $30 billion by the end of 2025, 5G will provide the ubiquitous, affordable, high capacity and secure connectivity to drive this increased investment. 5G will improve how healthcare professionals interpret their data and how consumers interact with the wearable devices. This will provide more detailed real-time health management information for consumers, with opportunities for the healthcare industry to develop a fully personalized medical advisory service connected to 5G. Greater information will be at the fingertips of healthcare professionals, meaning health diagnoses can be made quicker without needing to get in real time contact with the patient.

Aftermath of 5G Technology

There are a lot of concerns regarding the public health and safety in connection to the 5G.We need a specific standard which takes into account all the threats and benefits of 5G.

5G is expected to consume 3x more energy than it currently taking to power 4G LTE networks, according to IEEE Spectrum. This has led to some service providers, such as Ericsson, to commit to an energy-efficient 5G network deployment that relies on alternative renewable energy sources and the software oriented 5G Architecture which makes data storage and delivery more efficient through provisioning and dynamic routing.

Insects rely on high frequencies to communicate and detect food and predators. They do not have the same resistance to high frequencies that most animals do. A Study in 2008 published in Nature detailed the effects of various radio frequencies on simulated insect models, including that of the Honeybee. The study found that at the higher frequencies insects models absorbed more energy. This type of trials haven't carried on live insects that means the widespread effects of 5G on insects are still not known.

One of the major advantage of 3G cell towers was that they could cover vast territory with relatively few cells because the network does not require much bandwidth. When the technology advanced to 4G networks, the cells were producing much more bandwidths which means the coverage radius of each cell was smaller. As the 5G network will gets launched more cell towers will be required to produce high bandwidth because the cells are not able to cover as much as 3G or 4G cell covers because of this more cells will need to be rolled out.

CONCLUSION

The development of the mobile and wireless network sector is going towards higher data rates and all-IP principle. Mobile terminals are upgrading with more processing power every year , more memory on board, and longer battery life for the same applications. 5G include latest technologies such as SDR, nanotechnology, cognitive radio and cloud computing. 5G will be able to satisfy the requirement of the 1000times the traffic growth. It will provide users with fiber like access data rate and much lesser latency user experience. 5G technology is targeting to connect 100 billion devices and to deliver a consistent experience across a variety of scenarios including the cases of ultra-high traffic volume density, ultra-high connection density, and ultra-high mobility. 5G will be able to provide intelligent optimization based on the services and user awareness and it will improve energy and cost efficiency by over a 100 times, enabling us all to realize the vision of 5G.

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SMART CITY

Pratik Patil, MCA-II, DYPIMR

Mukta Lohakpure, MCA-II, DYPIMR

Mrs. Priya Joshi, Asst. Prof., DYPIMR

ABSTRACT

The purpose of this article is to summarize the current state of understanding the smart city concept and to present a proposed communication platform for the development of city services. The first part of the article is an introduction and definition of a smart city concept. This introduction gives an overview of various aspects - city services, smart infrastructure and facilities, using information and communication technologies, interconnection, feedback, and electronic and digital applications. The next part addresses individual challenges for the planning, development, and operation of cities. New solutions allow for use of different data on cities and meet the request for better city services. An overview of smart cities applications and services is given in the next section of the article. The deployment, implementation and approval of innovative internet based services and applications have to be made in order to permit facing the challenges of advanced cities.

An overview of some aspects related to the technological solution of services is discussed in the summary section.There are many advantages in promoting smart cities in terms of national benefits: creating competitiveness, promoting the business sector, improvement of living standards, proper utilization of resources, and the like. There are examples of smart cities in the world, and a lot can be learned from their experience and achievements. Israel has unique conditions, which include an educated populace, widespread use of information systems, and the fact that cities are not very large. However, Israel also faces quite complicated challenges, such as a severe shortage of land, a problematic security situation, and excessive concentration of the population.

In a debate, the Forum participants expressed the opinion that the proper planning of a City requires a holistic approach that coordinates the various branches. The city has to be looked at as a living organism, of which all the systems have to work in coordination with each other in order that it should continue to live. A wide variety of subjects has to be dealt with, as described above, and these pose serious challenges.

For this purpose, a methodology of holistic thinking has to be developed and an extensive and inclusive thought process is required. The city has to be built as a body, with the work progressing at each stage, not in parallel but as a network with back and forth correlations. Such a process was executed in several cities worldwide, although the whole subject is still in its embryonic stages, and the Forum was informed about the successes and the problems solved. In all cases, intensive and smart use of ICT technology was made to improve the performance of the systems of education, health, infrastructure, safety and emergency preparedness, retail and trade, public participation, understanding of values, needs, culture, and the unique DNA of each

INTRODUCTION

A smart city is a self-contained town in terms of evolution of information and communication infrastructure technology. A modern city offers intelligent solutions and helps organize daily life thanks to sensors which receive data, information, references, and analysis and then retransmits them. Making cities smarter is usually achieved through the use of ICT-intensive solutions. In fact, ICT is already at the heart of many current models for urban development. One advantage of smart cities is that pollution monitoring makes for an eco-friendly environment. The extensive use of ICT also empowers the development of essential services such as health, security, police and fire departments etc. A smart city can make our lives energy efficient. Wireless innovations can

support public health, giving doctors access to medical records easily and at minimal cost. The main goals are automated diagnosis and Health care for patients in dangerous situations. This will be implemented by sensor devices, which can monitor temperature, rate of breathing, etc. and provide a personal picture for Diagnosis.

A smart city uses information and communication technologies (ICT) to enhance quality, performance and interactivity of urban services, to reduce costs and resource consumption and to improve contact between citizens and government. Sectors that have been developing smart city technology include government services, transport and traffic management, energy, health care, water, innovative urban agriculture and waste management. Smart city applications are developed with the goal of improving the management of urban flows and allowing for real time responses to challenges. A smart city may therefore be more prepared to respond to challenges than one with a simple 'transactional' relationship with its citizens. Other terms that have been used for similar concepts include cyber Ville, digital city, electronic communities, flexi city, information city, intelligent city, knowledge-based city, MESH [Mobile, Efficient, Subtle, Heuristics] city, [technicity] telicity, teletopia, ubiquitous city, wired city.

SMART GRID

There are different definitions of the smart grid: functional or technological. A common example is the digital electricity grid that collects and distributes information. It provides electricity from the supplier through bilateral technical direction. A smart grid is a flexible system that links people with technology and natural systems. It consists of an electric grid, a communications network, and hardware or software to monitor and control it. It can provide power, minimize cost and provide instant information. See Figure 1, below.

Advantages:

- Accurate bills- no more estimates!
- Can highlight faulty appliances or potential safety issues.
- It reduces electricity losses (transmission, distribution etc.)

Disadvantages:

- Continuous communication network should be available.
- During emergency situation, network congestion or performance are big challenges in smart grid system.
- Cellular network providers do not provide guaranteed service in abnormal situations such as wind storm, heavy rain and lightning conditions.

SMARTMETERS

A smart meter system has benefits for the customer and the company. It consists of smart meters, communication infrastructure, and andcontroldevices. Smart meterscancalculate electricity usage, and provide information to the company to regulate power and monitor and control devices.

Advantages:

- Eliminating manual meter reading
- Monitoring the electric system more quickly
- Making it possible to use power resources more efficiently
- Providing real-time data useful for balancing electric loads and reducing power outages (blackouts)
- Enabling dynamic pricing (raising or lowering the cost of electricity based on demand)

Disadvantages:

- Bigger expense: customers have complained that they have seen an increase in their utility bills

- Potential dangers and hazards: smart meters have been known to cause fires
- Privacy concerns: utility companies can now see how much energy you've used and when you've used it

INTELLIGENT TRANSPORTATION SYSTEM

ITS uses modern techniques of communication and media technology in urban areas for the taxi system, mass rapid transit (MRT), light rail transit (LRT), electronic road pricing (ERP), road information management system (RIMS), traffic signal optimization system, electronic communication system, and automobile navigation systems to face many challenges in various means of transport. Smart transport systems contribute to the rational exploitation of existing infrastructure without resorting to the establishment of new facilities.

The objective of ITS is:
1-improve the economic productivity of current and future systems.
2-energy conservation and environmental protection.
3-improve the level of traffic safety.
4-increase the prosperity of travelers.
5-increase the operational efficiency of the transportation system.
6-reduce commuting time and cost.
7-predict the movement of traffic and events that may affect the future.

Advantages:

- Reduction in stops and delays at intersections.
- Speed control & improvement.
- Travel time improvement.
- Capacity management.
- Incident management.

Disadvantages:

- Difficult in use in mixed traffic.
- Preliminary difficulties in understanding
- ITS equipment costly.
- Control system software could be hacked by hackers.

SMART HOME

The papers reviewed had different views of the smart house. Some viewed the house in terms of its dependence on modern technology. However, we view the modern smart house as
The owners are mobile, computer, and internet networks, whether the owner is inside or outside the home. The goal of smart building is to satisfy both the owner and the occupant, and not everything that one customer requests is requested by another. One solution provided by a smart building is lighting control; an intelligent lighting system provides lighting everywhere
So that the occupant never has to enter a dark room. Energy and temperature controls provide cooling or heating in the home. Security and safety are provided by temperature and movement sensors, which can also turn off lights and lock doors when you exit, and sound the alarm if intruders appear. Entry and exit is controlled by pass codes entered on a keypad.

Advantages:

- **Functionality:** One advantage is that your house may be more functional for you. For example, you can connect with your house using an app and turn on the lights so they are on when you come home.
- **Environmentally Friendly:** Your smart house can also be more environmentally friendly, since you can control things like thermostats and light bulbs.
- **Insurance Benefits:** You may not realize it, but a smart home can get you a discount on your homeowner's insurance.
- **Customization:** You can also customize your system so it works the way you want it to. You can add whatever devices you want to use and ignore the ones you don't.

Disadvantages:

- **Privacy:** One problem regarding smart homes is voice activation. In order for it to work, voice activation has to be on and listening all the time
- **Bandwidth:** The more things that you have hooked to your wifi, the more bandwidth you are going to take up.
- **Internet Security:** One big problem with the IoT is that hackers can use all those machines and devices to host attacks and viruses on the rest of the Internet.
- **Power Surges:** Another disadvantage is that power surges can cause problems with the entire automation system, so you will have to make sure that you protect everything from surges.

SMART WATER

A smart city uses a variety of techniques and systems that contribute to reducing water use. Poor management and suboptimal use of water have large negative consequences. We need to have smart systems to maintain our natural wealth through 1-monitoring and control of environmental water such as natural rainfall, surface water, groundwater, wastewater and agriculture water, 2-analysis and response to the data to improve the efficiency of use, which requires cooperation with all stakeholders, 3-ensuring the safety and health of the network and making sure ongoing maintenance is performed, 4-controlling pollution and strengthening the capacity to respond in an emergency, 5-using smart water meters that predict the population's consumption of water, 6-designing green spaces which help reduce evaporation, and 7-using local plants and trees which require little water.

SMART HEALTH CARE

Smart cities provide multiple solutions, but require cooperation among local hospitals and private networks for the exchange of the necessary information to increase efficiency for the treatment of patients and link with pharmacies to provide drugs quickly and easily. Special wireless access to emergency departments can help with medical emergencies by transmitting vital information. Automated diagnosis and health care can be provided for the patient in
a hospital

Advantages:

The most important benefits were cost reduction, increasing patient satisfaction, increasing home care and outpatient services.

Disadvantages:
The most important disadvantage included reducing access, reducing the rate of hospital admissions and increasing employees' workload and dissatisfaction.

SMART FOOD

A smart food system consists of a tracking system which monitors the food supply, production, processing, transportation, and risk control. Another element is ensuringCompliance with health and safety systems. An emergency system can provide early warning of food security problems.

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"A STUDY ON VIEWER BEHAVIOUR AND MARKET PENETRATION WITH RESPECT TO STREAMING MEDIA"

Mr. Akshay Ramkrishna Iratkar , MBA , DYPIMR

Mrs. Tejashri Talla, Asst. Prof, DYPIMR

ABSTRACT:
The entire world has been shifting to Digitalization with time including online shopping, Online Payments and so on. Similarly the Entertainment Industry has also observed a Rapid Shift from watching shows on Television sets to watching them online through these leading service Providers like Netflix, Amazon Prime, ZEE 5, Sonyliv and Hot star. Over the top (OTT) refers to film and television content provided via a high-speed Internet connection rather than a cable or satellite provider Over the top (OTT) viewing became popular with Netflix's sharp growth as it segued from simply showing old movies and television shows to developing original content and distributing licensed content more quickly. Its fast-growing profitability and popularity, especially with younger audiences, has spurred wide-ranging competition. OTT content can be accessed directly on a computer, but it is often watched on a Web-enabled television or through an Internet-enabled device. This research is aimed at understanding better the end consumer choices and preferences, as far as consuming online video content is concerned in the OTT and DTH segment in India.

Key Words: ***Market Penetration, Consumer Behaviour, Streaming media sites, Internet connections, OTT (over the TOP service providers)***

INTRODUCTION:

The entire world has been shifting to Digitalization with time including online shopping, Online Payments and so on. Similarly the Entertainment Industry has also observed a Rapid Shift from watching shows on Television sets to watching them online through these leading service Providers like Netflix, Amazon Prime, ZEE 5, Sonyliv and Hot star. In line with global trends, the Indian consumer is increasingly consuming the content on digital platforms. This trend is observed for all type of content including news (text), music (audio), or video. Increasing internet penetration and mobile device proliferation and convenience of consuming the content anytime, anywhere are the key drivers for this trend. Rapidly increasing internet users India added 43 million internet users (20.5% growth) from October 2013 to September 2014 and total internet users crossed 254 million 6 in September 2014. Out of these, 235 million 6users accessed internet through mobile devices. The growth in internet users was seen both in rural and urban parts of India. Internet users in rural India is expected to reach 138 million by June 2015, while 216 million internet users are expected to be in urban India by then. With improved networks, better access to internet, multimedia service-capable mobile devices and application development ecosystem, more and more media consumption would happen on digital platforms. India has around 300,000 app developers and is already the second largest Android developer community in the world after the US.7 while the internet user base in India is growing at a rapid rate, most of these users (75%) belongs to the age group of less than 35 years. More than half of the app users in India are aged between 18 and 24

years and a further 29% between 25 and 35. 45% of these users reside in the top 4 metros.

Media consumption across the globe is increasingly happening in digital formats. The increase in the number of devices capable of supporting digital media along with increasing internet access speed, has provided consumers with an option to access the media content of his choice be it information, entertainment or social activity anytime, anywhere. Media consumption in the US has shown tremendous increase and has seen a significant jump from traditional media to new (digital) media. The rise of digital media players such as Netflix, Hulu, Amazon, Apple TV, Roku, and Boxee, etc. are challenging the traditionally maintained supremacy of the television as the main entertainment hub.

Rising data consumption with Smartphone penetration

While the proliferation on mobile devices would enable the digital media consumption, data prices, and anywhere connectivity would play equally important role in shaping the digital media consumption habits among Indian users. Average data price per MB on mobile networks has fallen significantly over the past few years; however, mobile data tariffs are likely to mirror the trends in 2G market where voice tariffs in India are stabilizing after long period of sharp falls.

Transactional Video on Demand

Transactional video on demand (TVOD) services rent or sell movies or television shows one at a time. Amazon Instant Video is a TVOD that debuted in 2006 as Amazon Unbox; the name was changed in 2011. The service rents and sells movies and television shows for separate fees. In February 2011, Amazon announced its Prime service, which offers two-day delivery of packages for a single annual fee, would add a subscription video component.

Subscription Video on Demand

Netflix began as a DVD by mail service in 1998 and added streaming in 2007. The company's first original content was the series "House of Cards," which became an immediate hit when all of the first season's episodes were released simultaneously on Feb. 1, 2013. The show offered a new way for viewers to watch a series, and propelled the company to sharply higher levels of attention and subscribers. The success of Netflix's continued expansion in original programming led other streaming video on demand (SVOD) companies to follow suit.

Amazon Prime offers unlimited streaming of a subset of Amazon Instant Video content. The company launched its first original series in 2013, which are only available to Prime members. Networks such as HBO, Showtime and CBS offer subscription-based services streaming their content over the top.

OBJECTIVES OF THE STUDY:

- To study the various streaming media service providers in India.
- To study the various kinds of programme do you generally watch on streaming media platform.

- To study the trends affecting the end consumers with regards to the OTT services

- To study the main reason of using Streaming media platform for watching video.

REVIEW OF LITERATURE:

Deloitte report "Digital Media: Rise of On-demand Content:

Deloitte report "Digital Media: Rise of On-demand Content" mentioned that more people spending time on digital media as compared to traditional media this is possible due to improvement in mobile devices technology and internet connectivity.

Aditya Tiwari (2018) "8 Best Video Streaming Services in India for Your Binge Watching In 2018

The entertainment industry has evolved dramatically over the last couple of years, especially with an ever-growing abundance of choices for accessing digital content on-the-go. Internet media has gone through a staggering evolution over the last few decades. New platforms and streaming services have emerged that allow you to watch video content over the Internet from literally anywhere and anytime you want via Smartphone's or tablets.

Dr. Virender Khanna, 'A Study on Factors Affecting Subscription Rates of Netflix In India:

Netflix entered India and 129 more countries on January 6th, 2016, with the target to increase its customer base. Through this project we want to understand the reasons behind the low subscription rate and to recommend ways to ensure better growth. Through the literature survey, we have identified various factors affecting low subscription rates of Netflix in India. After we have identified the factors necessary to take into consideration, we have developed a problem statement. We developed a research design which is applied and exploratory in principle.

Real-time Video-Streaming to Surgical Loupe Mounted Head-Up Display for Navigated Meningioma Resection

Wearable technology interfaces with normal human movement and function, thereby enabling more efficient and adaptable use. We developed a wearable display system for use with intra-operative neuron avigation for brain tumor surgery. The Google glass head up .Recent advances in Unmanned Aerial Vehicles (UAVs) have enabled countless new applications in the domain of aerial sensing. In scenarios such as intrusion detection, target tracking and facility monitoring it is important to reach a given area of interest (AOI).

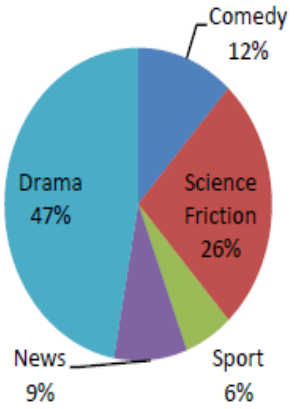
RESEARCH METHODOLOGY:

Convenience sampling is a non-probability sampling technique where subjects are selected because of their convenient accessibility and proximity to the researcher study and the researcher did not consider selecting subjects that are representative of the entire population. Convenience sampling was used to collect the data from 100 streaming media (OTT) users through personally designed Questionnaires. These questionnaire were distributed to the individuals who are using the streaming media to download web series video , games etc. Primary as well as Secondary, data is use in this research. Primary data is through structured questions which were asked to the clients and then taken Personally distributed questionnaire. Secondary data collected through various streaming sites and OTT service providers.

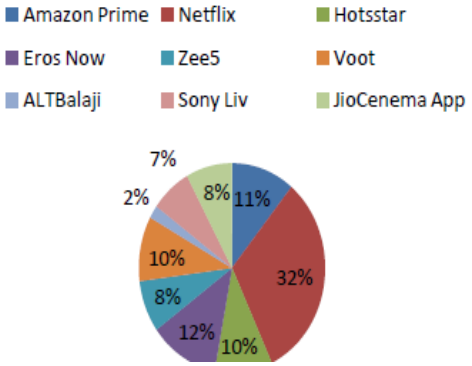
DATA ANALYSIS AND INTERPRETATION:

The data collected through the Questionnaire was analyses using Ms. Excel. The respondents were asked the question like how many hours they spend watching the Television or online, the kind of programme they generally watch on streaming

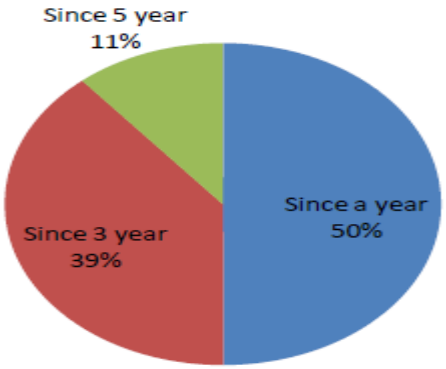
media platform such as Comedy, Science Friction, Sports, News, Other etc.



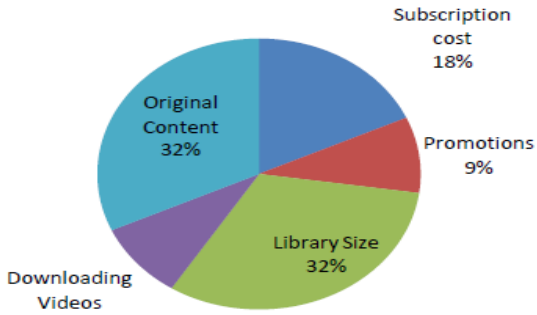
As we all know that in entertainment industry content is the master key. For that it important know that what kind of content usually viewer prefer to watch. As per survey thriller and suspense related content attracted to majority of youth. Also now a day's viewer preferred to watch sport on streaming media. Respondents were asked which streaming media they use



It is seen that most of the viewer having maximum subscription on Netflix and then Amazon prime reason behind content on Netflix and subscription charges that attracted most of the viewer then second rank is Amazon prime.



Due to unlimited data and internet speed streaming media get maximum advantage but two year back streaming media is not that much popular as per survey maximum viewer using streaming media from last one year.



After getting response on the above question for betterment of streaming media we came to know that Area that requires maximum attention is Amazon prime's library size, even though Amazon has recently spend huge amount content still it is not at par as compared to other sources thus in order to improve their customer base.

FINDINGS

Majority of respondent/viewer in Indian market still watching both TV as well as streaming media but in comparison with TV viewer preferred to watch streaming media especially youth population.

As per the research most of streaming platform has come up with new plan also offering sport channel and good collection of Hindi content (web series) at affordable price 365 per year that is near about 1 Rs per day.

Quality of content and discovering new innovative show or video quality, allow viewer to watch

shows as per free time these are the reason behind most of viewer preferred streaming platform. Future of streaming media is concern Area that requires maximum attention is Amazon prime's library size, even though Amazon has recently spend huge amount content still it is not at par as compared to other sources thus in order to improve their customer base.

CONCLUSION:

In this paper, we discuss the underlying potential in utilizing the vast amounts of audio-visual data broadcasted for the streaming media. Region specific content- A growing market for content is foreign-language programming. Partnerships with local-language content will curb traditional criticism that US-based streaming services only offer English-speaking content. Streaming Platform should focus on their pricing and should work towards reducing it as this is one of the major factors that are drawing customers away. The most determining factor of the growth of OTT services will be the government and regulatory stance towards them. In our opinion, it is important to keep in mind at all times that high speed Internet access, the opportunities it offers for the development of new business models such as OTTs and their implications on the viewers behaviour. Throughout history, technological revolutions have had "winners" and "losers", but finally what should be considered is the ultimate aggregate effect on the welfare of society at large.

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DIGITAL EDUCATION IN INDIA: not the next, now it is big thing

Priti Pipada, MCA II, DYPIMR

Mr. Keshav Thite , Asst. Professor , DYPIMR

Abstract:

The education system all over the world has gone through a dramatic change. Education worldwide is one of the important sectors to witness revolutionary changes in recent times. This happens primarily because of digital revolution taken place all across the world.

To resolve the flaw of the traditional education system, the world is moving towards digital education which mark all the issues and challenges of traditional education. The typical Indian classroom was once characterized by students sitting through long session, teacher used to discuss the things without any visual presentation. Now, grateful to digital technology, it is making life easier for both students and educators.

Digital Education is the use of a combination of technology, digital content and instruction in the education system to make it more effective and efficient than the traditional education system.

The purpose is to give overview of digital education, components & benefits of digital education in India, the future scope and possible challenges of an Indian society for moving towards digitalization.

Keywords: Education System, Digital Learning, Technology, Digital Education, Digitalization, E-learning.

Introduction:

Digital education means digital learning. Digital learning occurs across all learning areas. It is a learning that is supported by digital technology that makes effective use of digital technology. It gives opportunities for all, at one side School, colleges and other institution finds the rapid rise in enlistment and added revenue because of digital education, and students view this as a flexible and another option allowing them to study as per their convenient time.

Technology infuses classrooms with E-leaning tools, such as computers, laptops and handheld devices, supports learning 24 hours a day, 7 days a week, increases student engagement and motivation. Teaching and learning becomes a smoother experience as it includes animations, arcade and audio-visual effects. Digital learning chance and the use of open educational resources and other technologies productivity stimulate the rate of learning and better employ teacher time. Digital education in India is evolving at quickly. It is changing the way students learn concepts and theory in school and colleges. The traditional chalk-talk technique in school and colleges has been slowly changing with more interactive teaching techniques.

With the objective to make the rural India a part of digital age, Prime Minister Modi's administration has launched the Digital India campaign. It include providing broadband connectivity to a quarter of a million rural villages by 2019 and making Wi-Fi connections available in schools.

TRENDS OF DIGITAL EDUCATION

- Digitalized classroom a growing Trend.
- Video based learning.
- Massive open online course & other distant learning programs.
- K12 sector Game based learning.

REVIEW OF LITERATURE:

Shikha Dua et al (2015). They have discussed the trends and challenges of digital education in India and suggested the empowering Inventive classroom model for learning. They have interpolate different challenges of digital education India. The future trend of digital education includes digitalized classroom, video and game based learning. Constant refinement required in schools and teacher for the development of digital education in India.

 Himakshi Goswami (2016). The study highlighted the different lucky chance and challenges of digital India programmer. It will help government of India to unite the Government Departments with the people of India. This programme introduced by government of India will help in transforming country into a digitally authorize economy. The main purpose is to reduce the paper work and help in providing different Government services to citizens. India is having different languages, civilization, and customs, food habits, and way of life, laws and traditions. The purpose this programme is to integrate whole country digitally but languages would be the main challenges in the execution of such programme. It describes the different lucky chance of the programme for the people of the country.

RESEARCH METHODOLOGY AND TOOLS:

The main focus of providing a complete picture of the situation with the aim of understanding of behavior and inter-relations. The research for this paper was conducted through overview survey, without any real work being conducted. The study is essentially based upon the secondary data. A large resource of written material was used, which included books magazine articles, academic journals, and the websites.

TOOLS:-

There are lots of e-learning tools like Youtube, skype, udemy, whatsapp, zoom etc. have been created and purpose of giving freedom to the student, motivating collaboration, and facilitating communication between teachers and students.

1. Edmodo

It is an educational tool that connects teachers and students, and is learned into a social network. It has more than 34 million users who connect to create a learning process that is more enriching, personalized, and aligned with the opportunities brought by technology and the digital environment.

2. Project

It allows you to create multimedia presentations, with dynamic slides in which you can embed adaptive maps, links, quizzes, Twitter timelines, and videos. During a session, teachers can share with students' academic presentations which are visually fit to different devices.

3. TED-Ed

It allows creating educational lessons with the collaboration of teachers, students, animators generally people who want to escalate knowledge and great ideas. This website allows equalizing access to information, both for teachers and students.

4. cK-12

It is a website that seeks to lessen the cost of academic books for the K12 market in the us and the world. To achieve, cK-12 has an open source interface that allows creating and sharing educational material through the internet, which can be create and modified exercises, videos, & audios.

5. Class Dojo

It is a tool to improve student behavior: teachers provide their students with instant feedback so that good accumulation in class is 'accoladed' with points and students have a more receptive attitude towards the learning process.

6. Kahoot!

It is based on games and questions. Through this tool, teachers can create questionnaires, analysis, or surveys that complement academic lessons.

Online Education Initiatives-

The Covid pandemic has shaken the entire nation and the education sector is one of the hardest hit during this impending crisis. Colleges and universities have been shut for almost eight months now to curb the spread of the virus. This is a major difficulty for students and teachers who can no longer access learning resources through the traditional model of education.

To overcome this crisis, the Government of India has taken several ICT (Information Communication Technology) initiatives through the Ministry of Education and UGC (University Grant Commission) to launch free digital learning platforms for students.

These online platforms are available for all students, learners, and teachers where they can interact with each other in a classroom setting.

Here is some popular initiatives:-

- SWAYAM - (Study Webs of Active Learning for Young Aspiring Minds).
- DIKSHA

3. e-PG Pathshala

4. Swayam Prabha

5. National Digital Library of India (NDL)

6. E-ShodhSindhu

7. NPTEL - (National Programme on Technology Enhanced Learning).

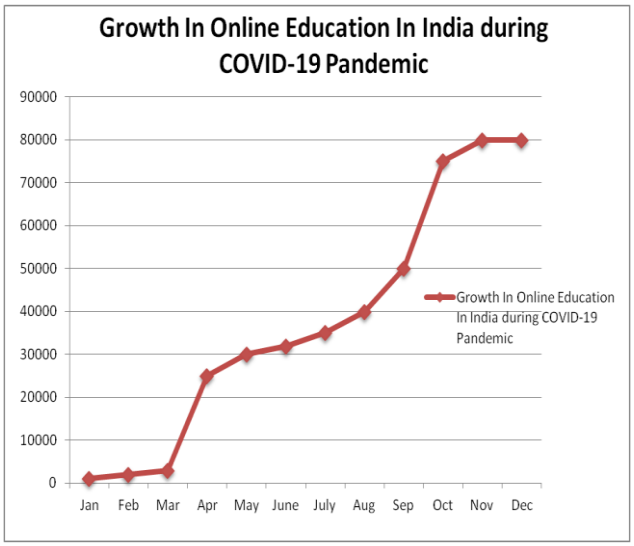
8. Virtual Labs

Growth in Digital Education:-

India has released its half-yearly report of 2020 (H1 Report) highlighting growth of Digital Education.

While the report highlights the trend and focuses on learner's behavior during COVID-19, the most in-demand online categories. India has seen a notable increase of 5X to 30X in growth in the number of learners in certain online categories during the 2020.

Edutech platforms saw increased approval among learners and witnessed 25X growth:--



CONCLUSION:

So many different ways to define e-learning and the educational approaches that can be taken in these learning environments, it is the interpretation of this author that e-learning is an innovative approach to learning. . The study clearly points that development of education base is required for the development of digital education across the country. It is an aggregate way of teaching and learning that meets the needs of today's digital natives. This will to considerable increase in base investment in the education sector.

It is an environment made up of collaboration, choice that supports a successful online learning experience. The study highlighted the different challenges of digital education in India In order for learners to be successful in this learning environment the challenges to e-learning must be overcome with support and best practice solutions.

Developing a purposeful and well defined online course, which supports the demonstrator and learner, means devoting the appropriate time and inserting the applicable course elements into the e-learning environment.. Government of India needs to take the required measures to prevail over these challenges for the development of digital education in India.

Limitations:

The outcome of the actual material, and ultimately the result of the research, is mainly dependent on a limited number of teachers, school leaders and municipality representatives. It is important that the outcome of this research should be considered as elucidatory examples enabling understanding of a complex problematic situation rather than generating definitive findings or reality blueprints.

Performing qualitative data collections, observations and interviews, the possibility of the researcher's bias, in terms of opinions and disadvantages, as well as her own background may influence the outcomes. .

Topics for further research:

The main recommendation for future work is to widen and deepen the investigation by conducting a full SSM Learning Cycle. Teachers as well as all other actors involved in the complex situation of digital technologies integration into everyday education should be included in a future study. A study would further clarify multiple different perspectives and also create shared participant understanding and, ideally, common vision. Full SSM Learning Cycle will necessarily engage multiple actors and catalyze participant collaborations. This deeper examination might first be implemented within a municipality or county level before being applied at a macro or national level.

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Clean for U- Solid Waste Management Using IoTs

Kajal Dofe , MCA-III , DYPIMR
Kiran Dofe , MCA-III, DYPIMR
Dr. Rupal Choudhary , Asst. Prof. DYPIMR

Abstract: If there is an issue of sanitation and hygiene in our cities, most of it is contributed by its citizens resulting in increased spreading of diseases. Hence, to overcome this problem, a concept of Smart Bin (Clean for U) - Solid waste management along with the android application is proposed in this paper. The garbage bin with three compartments (Dry, Wet, Sanitary) deployed with sensors and are networked together using IOT. The sensors deployed in the garbage bins collect the weight of garbage dumped by user. Depending on weight of the garbage and frequency count of bin usage, reward will get generate and user will get the reward. Once the garbage reached to particular threshold limit, SMS notification will be sent to government authority for collecting the garbage. The experimental simulation is done in ptc creo tool. A hardware prototype is developed for the proposed framework. Analysis of the proposed scheme provides better results in waste management.

Keywords: Smart Bin, Microcontroller, PIR sensor, Ultrasonic Sensor, SIM800L/SIM900.

1. INTRODUCTION

Generally, Waste can be divided into two categories, Dry waste and Wet waste. But there is one more type of waste i.e. Sanitary waste that nobody wants to think about. Many environmental problems are raised by modern cities due to inappropriate segregation and disposal of sanitary waste. The purpose of this work is to present a cost-

effective retrofittable device that can be used on new as well as existing bins of localized and large scale cases, such as parks, malls, university campus and hospitals. The literature of this paper will present a literature review of past related papers and commercial solutions. Then methodology and methods section will explain the work of the system and all the hardware and software used in this work, besides the design of the smart bin (Retrofittable device). Finally, the results of tests will be discussed followed by conclusions and future work.

2. RELATED WORK AND LITERATURE REVIEW

First paper "IOT Based Smart Bin "by Harshita Chugh, Dushyant singh, Shahensha shaik, Ashwani Singla published in International Research Journal of Engineering and Technology (IRJET) in June 2017. In this, they have implemented the real time waste monitoring garbage system with the smart bin to check the levels of garbage in dustbin whether the dustbins are full or not. In this system the information of dustbin can be accessed by the user/authorities from anywhere by using android app. When garbage levels reached the condition details of bin will be sent to the authorities via email.

Second paper "The Design and Implementation of Smart Trash Bin" by Fady E. F. Samann published in Academic Journal of Nawroz University in January 2017. This paper presents a cost-effective design of an intelligent waste container for small-scale cases. This system is based on Arduino Nano board and an ultrasonic sensor to monitor the fullness level of the container and give SMS alerts using a GSM module. The system is powered by lithium battery power bank supported by solar cell panel. The system provides an option of charging external portable devices using the power bank. Moreover, the system will store usage events,

recorded by PIR sensor, and fullness events on a memory card, which is also used to play audio message using a speaker, when the bin is being used.

Third paper, "Smart Waste Management Using WSN and IoT" by Sivasankari, Bhanu Shri and Y.Bevish Jinila published on Research gate on 21 June 2017. In this, in this paper a scheme on smart waste management using Wireless Sensor Networks (WSN) and IoT (Internet of Things) is proposed. The garbage bins are deployed with sensors and are networked together using WSN. The sensors deployed in the garbage bins collect the data for every determined interval. Once the threshold is reached, it raises a request to the GCA (Garbage Collector Agent). This agent collects the requests of all the filled vehicles and communicate using IoT framework.

Fourth paper is "Web-Based reward and redemption system for smart recycle system" by Mohd Helmy Abd Wahab, Aeslina Abdul Kadir, Mohd Razali Md Tomari, and Mohamad Hairol Jabbar Faculty of Electrical and Electronic Engineering, University Tun Hussein Onn Malaysia published on Research Gate in August 2015. In this, the smart recycle bin is proposed to give a reward to public user who thrown the recyclable waste into the innovated smart recycle bin by giving points (later can be converted to money). This paper discussed the development of reward-based smart recycle system. The system has been implemented in a web-based environment and it supports for public user and waste authority. The system is then to be integrated with the desktop-based applications for waste authority to manage the point and transaction from the innovated recycle bin to the reward system.

Fifth concept is "Garbage ATMs" These are the smart bins developed in Nashik can reward user with money. They built smart automated waste-bins called the KRRYP Garbage ATM. The system actually has two dustbins and one LCD screen. Users will be provided with a card that has to be swiped for the dustbins to work. Once they have swiped it, the LCD screen will automatically ask the user a general knowledge question with two options as answers (for either of the bins). For instance, if the user thinks the right answer is Option B, then they will dispose their waste in the bin marked B. Depending on whether their answer is accurate, they will collect points in their smart cards, which they can later trade for coupons or cash.

3.PROPOSED SYSTEM

- Aim is to develop the IOT Based solution, smart incentivised bins(retrofittable) along with Android application (Gamified portal) that will generate points depending on the weight of garbage.
- Proper segregation of the waste in three categories i.e. Dry, Wet, Sanitary.
- Biodegradable bags with three different colours will be provided to segregate the waste.

Figure (1) shows the complete step by step flow of proposed system.

Fig 1: Proposed system workflow

Flow of the system:

1) A society level smart bin with OLED screen , PIR sensor , Load cell and 3 Parts (Dry, Wet, Sanitary) with biodegradable bags of three different colours blue(dry waste), green(wet waste) and red(sanitary waste) to ensure the segregation of waste properly.
2) Once the user come into a range of PIR sensor Lid of Bin will open automatically.
3) User dumped the garbage into the smart bin.

4) Bin will generate QR Code using the data captured by load cell i.e. Weight of the garbage along with date, time and BinID, and display that QR code on OLED screen.
5) User will scan this QR code using the Smart Bin application (Android application).
6) Central server will be notified through auto generated SMS triggered when the QR code is scanned.
7) Based on the frequency count of bin usage and weight of garbage the reward (Coupon, Vouchers, monitory) will be generated and stored in the database of Smart Bin application.
8) User will get the reward.
9) User can compete with other citizens.
10) Once the garbage reached to particular threshold limit, government authority will be notify with the help of Android application.

Figure(2) shows the use case diagram of proposed system.

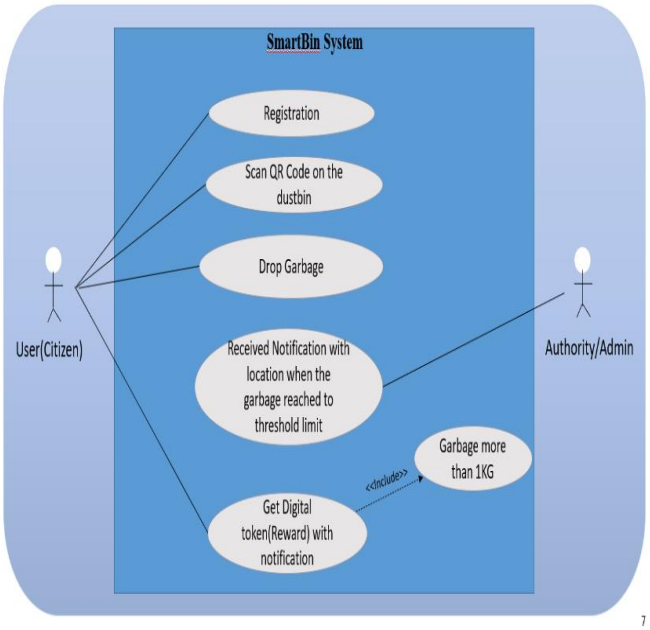


Fig 2: Use case diagram of proposed system

4. HARDWARE SETUP AND IMPLEMENTATION

4.1 **Design**:

The system tries to be cost-effective and user friendly. Figure (3) shows the design of system (Hardware) with load cell, Arduino board, PIR sensor and ultrasonic sensor in the Bin.

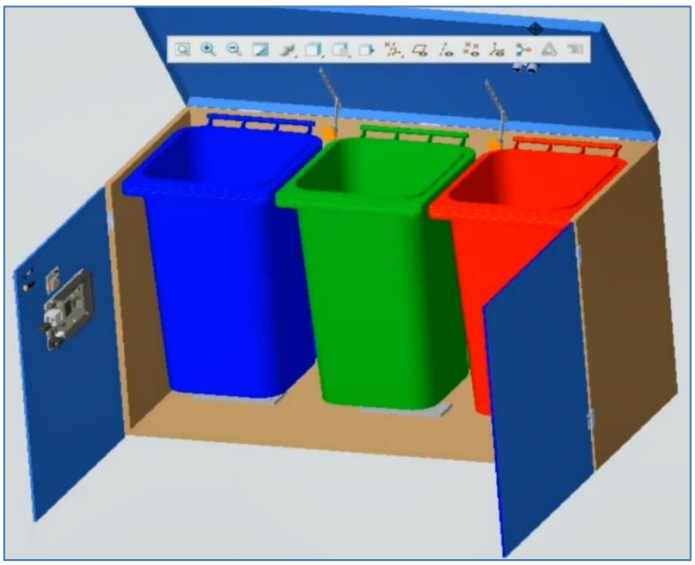


Fig 3: Proposed system Design

Figure (4) shows Dashboard GUI of Smart Bin application where user can see his records of bin usage along with the weekly statistics.

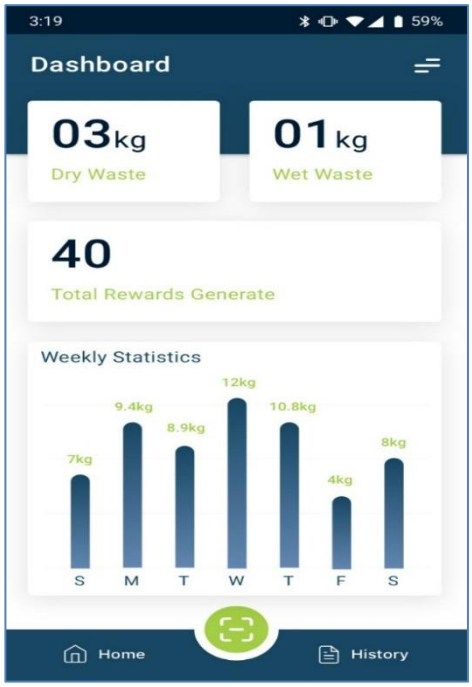


Fig:4 GUI of smart bin application (Dashboard)

4.2 Hardware Specification:

IOT: The Internet of things (IoT) is a system of interrelated computing devices, mechanical and digital machines provided with unique identifiers (UIDs) and the ability to transfer data over a

network without requiring human-to-human or human-to-computer interaction. It is a network of physical device, vehicles, homes appliances and other items embedded with electronics, software, sensors, actuators, and connectivity which enables these object to connect and exchange data. Here ESP8266 Module is used as a wireless network.

I. Arduino Mega 2560:The Arduino Mega 2560 is a microcontroller board based on the ATmega2560. It has 54 digital input/output pins (of which 15 can be used as PWM outputs), 16 analogue inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Mega 2560 board is compatible with most shields designed for the Uno and the former boards Duemilanove or Diecimila.

II. GSM Module: GSM is a global system for mobile communication. It operates either the 900MHZ to 1800MHZ frequency band. In this system GSM is used for sending message and call to garbage collective person from municipality office. when the garbage will be at threshold level then the GSM will work.

III. ESP8266: The ESP8266 Wi-Fi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your Arduino device and get about as much Wi-Fi-ability as a Wi-Fi Shield offers (and that's just out of the box)! The ESP8266 module is an extremely cost effective board with a huge, and ever growing, community.

IV. PIR (Pyroelectric ("Passive") InfraRed)Sensors: PIR sensors allow you to sense motion, almost always used to detect whether a human has moved in or out of the sensors range. They are small, inexpensive, low-power, easy to use and don't wear out. For that reason they are commonly found in appliances and gadgets used in homes or businesses.

V. OLED Screen(Organic Light Emitting Diode)

VI. Ultrasonic sensor: Ultrasonic sensor is a device that can measure the distance to an object by using sound waves. It measures distance by sending out a sound wave at a specific frequency and listening for that sound wave to bounce back.

VII. Load Cell: A load cell is a type of transducer, specifically a force transducer. It converts a force such as tension, compression, pressure, or torque into an electrical signal that can be measured and standardized. As the force applied to the load cell increases, the electrical signal changes proportionally. In this System load cell is use to convert weight of garbage into an electrical signal.

VIII. servo motor: A servo motor is an electrical device which can push or rotate an object with great precision. If you want to rotate and object at some specific angles or distance, then you use servo motor. It is just made up of simple motor which run through servo mechanism. In this System servo motor is used to open the lid of bin.

4.3 Software Specification:

I. Arduino IDE: The Arduino Integrated Development Environment is a cross-platform application that is written in functions from C and C++. It is used to write and upload programs to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards.

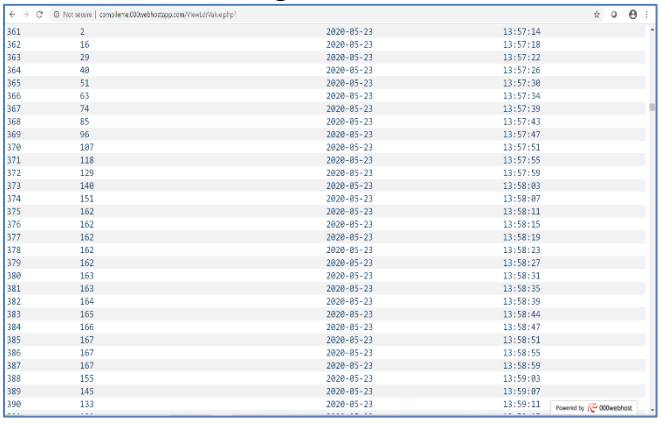
II. Android Studio 3.5.3

III. Operating System: In this system Microsoft Windows Operating system is used as a platform for the application development

IV. Database: In this system MySQL database is used. it is an open-source relational database management system.

5.RESULT AND DISCUSSION

This section discusses about the results generated by the proposed system. When user dumped garbage into smart bin, load cell will calculate the weight of garbage. That data will be send to the server database through ESP8299 module.



361	2	2020-05-23	13:57:14
362	16	2020-05-23	13:57:18
363	29	2020-05-23	13:57:22
364	40	2020-05-23	13:57:26
365	51	2020-05-23	13:57:30
366	63	2020-05-23	13:57:34
367	74	2020-05-23	13:57:39
368	85	2020-05-23	13:57:43
369	96	2020-05-23	13:57:47
370	107	2020-05-23	13:57:51
371	118	2020-05-23	13:57:55
372	129	2020-05-23	13:57:59
373	140	2020-05-23	13:58:03
374	151	2020-05-23	13:58:07
375	162	2020-05-23	13:58:11
376	162	2020-05-23	13:58:15
377	162	2020-05-23	13:58:19
378	162	2020-05-23	13:58:23
379	162	2020-05-23	13:58:27
380	163	2020-05-23	13:58:31
381	163	2020-05-23	13:58:35
382	164	2020-05-23	13:58:39
383	165	2020-05-23	13:58:44
384	166	2020-05-23	13:58:47
385	167	2020-05-23	13:58:51
386	167	2020-05-23	13:58:55
387	167	2020-05-23	13:58:59
388	155	2020-05-23	13:59:03
389	145	2020-05-23	13:59:07
390	133	2020-05-23	13:59:11

Fig 5: Data(weight)calculated by load cell

Above figure(5) shows the data from server database with date and time.

Fig 6: Reward generated by application

Above figure (6) shows the reward generated by the application after scanning the QR code displayed on the OLED screen.

Fig 7(a)

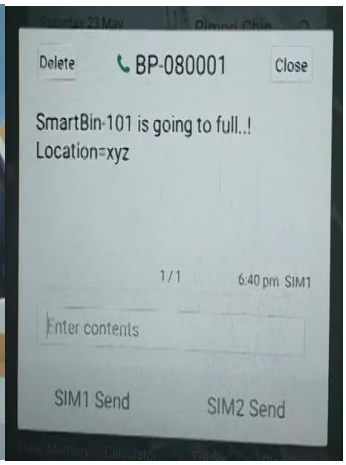


Fig7(b)

Once garbage reached to threshold limit SMS is send to mobile which is shown in the above figure 7(a) and 7(b).

6. CONCLUSION

- We have been implemented the real time waste monitoring system with the **SMART BIN** for segregating waste according to its type as a result it will keeps recyclable material out of landfills and keeps incompatible garbage separate from each other. Moreover the reward based smart incentivised bins(retrofittable) along with Android application (Gamified portal) that will generate points depending on the weight of garbage and algorithm to check the levels of garbage in dustbin whether the dustbins are full or not. In this system the information of dustbin can be accessed by the user/authorities from anywhere by using android application. When garbage reached to the particular threshold limit details of bin will be sent to the authorities via SMS and this system will reduce the monitoring system of cleaner to check the garbage levels as result this will save time.

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"Study Integrated Material Management for better Inventory Control."

Mr. Rahul Deore, Asst. Professor, DYPIMR

Abstract

Study the role/importance of Inventory system in market and customer satisfaction is the most important goal of every organization therefore it is inevitable to adopt integrated Inventory Management approach for new product development strategy. Financial – Material management for any product is a dynamic decision making process involving a series of inter-related activities.

Study of this project is done by discussing with

store manager about ERP System and ABC technique of managing inventory in this company. By asking some questions to store manager and other persons in store this study is completed.

Keywords: ***I****nventory,ABCAnalysis,VED Analysis,Store Management ,Just in Time,Stock.*

1. Introduction

Inventory Management

Inventory management and supplychain management are the backbone of any business operations. With the development of technology and availability of process driven software applications, inventory management has undergone revolutionary changes.In any business or organization, all functions are interlinked and connected to each other and are often overlapping. Some key aspects like supply chain management, logistics and inventory form the backbone of the business delivery function. Therefore these functions are e xtre mely important to marketing managers as well as finance controllers. Inventory management is a very important function that determines the health of the supply chain as well as the impacts the financial health of the balance sheet.

Requirements and avoid over or under inventory that can impact the financial figures. Inventory is always dynamic. Inventory management requires constant and

careful evaluation of external and internal factors and control through planning and review. Most of the organizations have a separate department or job function called inventory planners who continuously monitor, control and review inventory and interface with production, procurement and finance departments.

Inventory Management Techniques

Managing inventory can be a daunting task, and if it isn't done properly it could cost

company thousands of dollars. Inventory management grows more and more complicated with increase in sales volume and diversification of product assortment.

Stock Re vie w -Stock review is a regular analysis of stock versus projected future needs. This can be done through a manual review of stock or by using inventory software. Defining your minimum stock level will allow you to set up regular inspections and reorders of supplies. Make sure to take into account certain situations that can arise, such as vendors taking longer than average to replenish stock. This will aid you in using just-in-time ordering, where the inventory is held for a minimum amount of time before it moves to the next stage in the supply chain. In businesses where manual inventory management techniques are still in use, the primary inventory control methods include:

- **Visualcontrol Tickler control Click-sheet control**

You shouldn't perform manual reviews because they can take a lot of time and possibly produce errors. Businesses are starting to invest in software to automate the review, and it will help organizations keep track of their inventory, ensure timely reorders, and avoid costly shortages

ABC Analysis -This is a popular way to analyze your inventory. Under this method, you classify the inventory into three categories, such as A, B and C. These categories are based upon the inventory value and cost significance. Also, the number of items and values of each category are expressed as a percentage of the total

Items of high value and small in number are termed as "A"

Items of moderate value and moderate in number are termed as "B"

Items of small in value and large in number are termed as "C

To manage each category separately: The nice thing about group C is that it can be fairly hands-off, while group A requires special attention. You can use ABC analysis in conjunction with the just- in-time technique to help you get your reorder timing just right.

VED Analysis: VED analysis represents classification of items based on criticality. The analysis classifies the items into three groups called Vital, Essential, and Desirable. Vital category encompasses those items for want of which production would come to halt. Essential group includes items whose stock outs cost is very high. Desirable group comprises of items which do not cause any immediate loss of production or their stock-out entail nominal expenditure and cause minor disruptions for a short duration.

SDE ANALYS IS: SDE analysis is based on problems of procurement namely:

- Non-availability Scarcity Longer lead time
- Geographica allocation of suppliers
- Reliability of suppliers, etc.

SDE analysis classifies the items into three groups called 'Scarce', 'Difficult' and 'Easy'. The information so developed is then used to decide purchasing strategies.

Just In Time: The objective of JUST IN TIME method is to increase the inventory turnover and at the same time reduce the

inventory holding cost. JIT inventory system also exposes the unwanted or the dead inventory held by the retailer/ manufacturer. This method is ideal for manufacturing organization and it is not used in Retail industry in general. This will also involve usage of Kanban card to track inventory movement.

Vendor Managed Inve ntory: As the name explains, it involved SKUs managed directly by the supplier. Inventory is replenished based on the sales on regular intervals by the vendor. The retailer provides shop floor space and the vendor is charged a consignment rate on every product sold at the location. The ownership of the items from receiving to sales and inventory loss if any will be with the supplier.

2. Objectives:

1) To Study the Inventory Management Techniques.

2) To Study the procedure of Implementation of ABC Analysis.

3) To Study the Different types of Inventory Control techniques.

3. Research Methodology

Primary Sources of Data-Primary data are information collected or generated by the researcher for the purposes of the project immediately at hand. For example, an investigator wants to know about the level of job satisfaction enjoyed by the workers industry. He can prepare a schedule and meet a sample number of workers and ask for their opinions. This is going to be the information collected for the object of this study and therefore becomes primary in nature. When the data are collected for the first time, the responsibility for the processing of data also rests with the original investigators. Ordinarily, experiments and surveys constitute the main sources of primary data. For better understanding of the nature of primary sources of data advantages and disadvantages will have to be studied

Primary Data Methods of Collecting Primary Data

-The Primary data are the information generated to meet the lesser specific needs of the investigation at hand. Thus, the investigator has to collect ,data separately for the study undertaken. The following are the three methods which are used to compile primary data.

(1) Observation

(2) Schedule and questionnaire

(3) Interview.

1)Observation

This is one of the cheaper and more effective techniques of data collection. This approach to the collection of information is as old as human race. Much of our knowledge about human beings, rounding is collected only through this process. Observation is indispensable not only in sciences but in social sciences research also observation has its own utility. It is not always possible to quantify the data and draw accurate conclusions on the basis of such data. Thus, the observation method is generally adopted for testing hypothesis.

Inventory Management system has observed by

giving visit to the store department. Bin Card, Coding of Inventory, Inward and Outward of

Inventory, ERP system, ABC technique all things related to Inventory Management has been observed

Study of this project is done by discussing with store manager about ERP System and ABC technique of managing inventory in this company. By asking some questions to store manager and other persons in store this study is completed.

2) Interview-

Is also useful technique of data collection through primary sources. It is a verbal method of securing data in the field surveys. Information is obtained by conversing with the respondents. .

Secondary Sources of Data –

Secondary data refer to the information that has been collected by someone other than a researcher for purposes other than those involved in the research project at hand. There are various factors such as the nature of the study, status of the investigator, availability of financial resources, time and degree of accuracy of the results desired, that decided the choice of the sources of data that enriches the utility of the study. The study of this project is made with the help of secondary data

1. **Internal Sources:**

This data is collected from the organization. 1. With the help of storage data in the organization as well as information got from Store manager who gives fair idea of how inventory management is done in the organization By observing internal Inventory related Reports and Documents like Bin Cards, Purchase Order, Goods Receipt cum Inspection Note etc.

2. **External Sources:**

Company Website: Some information is collected from company website. Books: Textbook of Logistics and supply chain management by D K

Agrawal and Inventory Management by LC Jhamb is used during the study

4. Tool and Method Used-

MATRIXFACTORS is a tool to track all the shipments and Deliveries , it involves all the data included as below-

To update the deliveries and shipments

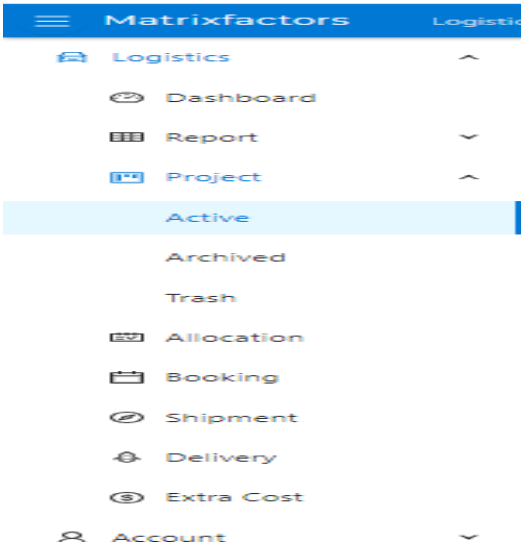
To have all the address booking slots

To make delivery appointment with customer

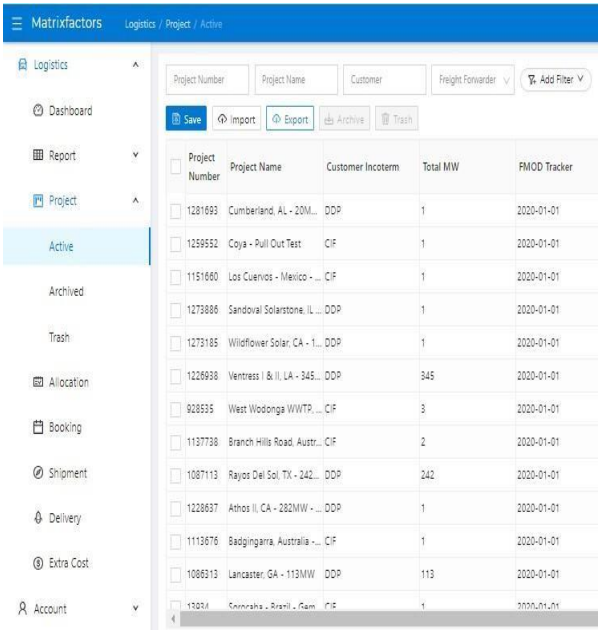
To find return shipments

To analyse the process with FF

MATRIXFACTORS-is a tool to track all the shipments and Deliveries , it involves all the data included as below:To update the deliveries and shipments,To have all the address booking slots,To make delivery appointment with customer,To find return shipments,To analyse the process with FF

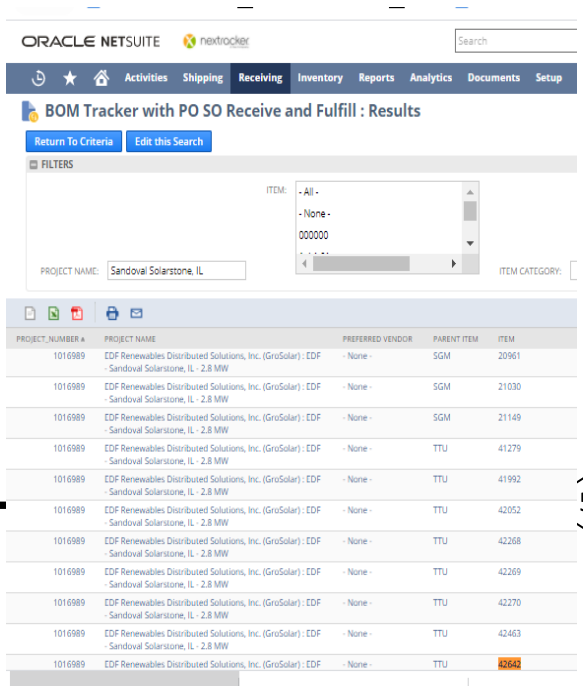


5. Data Analysis



Oracle Netsuite-

Netsuiteis used to find out decrepencies of individual part and make transaction as fulfillment and receive the Pos and SOs.



One of the major operating difficulties in the scientific inventory control is an extremely large variety of items stocked by various organizations. These may vary from 10,000 to 100,000 different types of stocked items and it is neither feasible nor desirable to apply rigorous scientific principles of inventory control in all these items. Such an indiscriminate approach may make cost of inventory control more than its benefits and therefore may prove to be counter-productive.

Therefore, inventory control has to be exercised selectively. Depending upon the value, criticality, and usage frequency of an item we may have to decide on an appropriate type of inventory policy. The selective inventory management thus plays a crucial role so that we can put our lim ited control efforts more judiciously to the more significant group of items. In selective management we group items in few discrete categories depending upon value; criticality and usage frequency. Such analyses are popularly known as ABC, VED and FSN Analysis respectively. This type of grouping may well form the starting point in introducing scientific inventory management in an organization.

ABC ANALYSIS:

The concept ABC (Always Better Control) Analysis is based on 'Think on the Best and then on the Rest'. ABC analysis underlines a very important principle "Vital few: trivial many" Generally, companies are required to keep stock of large number of items used in production and distribution. In practice, it is not possible to maintain and control a similar/ proper level of inventory of all items, which is also not feasible due to resource constraints. Hence, the prevalent practice is that sincere efforts are made to have a proper control on the most circulating items and least on rare circulating once. ABC analysis offers a basis for grouping of items on certain basis of annual/ monthly consumption value. In other words, of an item's unit price is very little but if it is a most circulating items and its monthly/annual consumption value is maximum, then closer and careful control will be done and vice versa.

Hence, In ABC analysis, items are categorized in three broad groups, namely; A, B, and C, on the basis of their monthly/annual consumption value.

Consumption Value

1.**A Category Items** It is usually found that 20% of the total items account for 65% of the total money spent on the materials. These items require detailed and rigid control and need to be stocked in smaller quantities. These items should be procured frequently, the quantity per occasion being small. A healthy approach, however, would be to enter into contract with the manufacturers of these items and have their supply in staggered lots according to production programme of the buyer. This, however, will be possible when the demand is steady. Alternatively, the inventory can be kept at minimum by frequent ordering

2.B Category Items Average monthly/annual consumption valued items are grouped in category

B. Generally 30% items account for approximately 25% of the total sales or consumption value. This category of items needs a closer and more careful inventory management. These items cannot be overlooked but need a lesser degree of attention and control than those in class A but more than c category items

3.C Category Items The low monthly/annual consumption valued items are grouped in C. Again, generally, 50% items account for approximately 10% of total sales or consumption value. This category of items needs the least attention for inventory management. No doubt, a loose control of C category items leads to a total inventory cost but this will not be so much to

affect overall inventory cost.

Categories of Items

Category of Items	*% of Items*	*%of Monthly/Yearly Consumption Value*	*Degree of Inventory Management*
A	15	74.5	Best
B	15	15.4	Better
C	70	10.1	Good
Total	**100**	**100**	

Inventory Study:

'Inventory' may be defined as 'usable but idle resource'. If resource is some physical and tangible object such as materials, then it is generally termed as stock. Thus stock or inventories are synonyms terms though inventory has wider implications**.** Or Inventory is a detailed list of movable items, which are necessary to manufacture a product and to maintain the equipment and machinery in good working order. The quantity and the value are also mentioned in the list. Broadly speaking, the problem of INVENTORY in inventory management is one of maintaining, for a given financial investment, an adequate supply of something to meet an expected demand pattern. This could be raw material, work in progress finished products or the spares and other indirect material.INVENTORY system in inventory can be one of the indicators of the management effectiveness on the materials management front. Inventory turnover ratio (annual demand/average inventory) is an index of business performance. A soundly managed organization will have higher inventory turnover ratio and vice-versa. Inventory management deals with the determination of optimal policies and procedures for procurement of commodities. Since it is quite difficult to imagine a real work situation in which the required material will be made available at hr point of use instantaneously, hence maintaining inventories becomes almost necessary. Thus inventories could be visualized as 'necessary evil'.

Thus Inventory management/control during use of INVENTORY system is concerned with achieving an optimum balance between two competing objectives. The objectives are:To minimize investment in inventory , minimize the service levels to the firm's customers and its own operating departments

Inventory Related Cost An inventory as per INVENTORY system may be defined as one in which the following costs are significant: Cost of carrying inventories (holding cost), Cost of incurring shortages (stock out cost): Cost of replenishing inventories (ordering cost): Cost of carrying inventories (holding cost)

This is expressed as Rs/item hold in stock/unit time. This is the opportunity cost of blocking material in the non-productive form as inventories. Some of the cost elements that comprise carrying cost are- Cost of blocking capital (interest rate); cost of insurances; storage cost; cost due to obsolescence, pilferage, deterioration, etc. It is generally expressed as a fraction of carrying charges in value of the goods stocked per year

For example, if the fraction carrying charge is 20 % per year and a material worth is Rs. 1000 is kept in inventory for one year, the unit carrying cost will be Rs200item/year. It is obvious that for items that are perishable in nature, the attributed carrying cost will be higher.

Cost of incurring shortages (stock out cost) This is opportunity cost of not having an item in stock when one is demanded. It may be due to lost sales or backlogging. In the backlogging (or back ordering) case the order is not lost but is backlogged, to be consolidated as soon as the item is available on stock. In lost sales case the order is lost. In both cases there are tangible and intangible costs of not meeting the demand on time. It may include lost generally expressed as Rs/ item short/ unit time Cost of replenishing inventory (ordering cost) This is the amount of money and efforts expended in procurement or acquisition of stock. It is generally ordering cost. This cost is usually assumed to be independent of quantity ordered, because the fixed cost component is generally more significant than the variable component. Thus it is expressed as Rs / order. Thus three types of cost are the most commonly incorporated in inventory analysis though there may be other costs parameters relevant in such an analysis such as inflation, price discounts et

Motives for Holding Inventories: It is possible to identify three major motives for holding inventories - The transactions motive propels a business to maintain inventories so that there are no bottlenecks in production and sales. It is natural for a business to plan inventory investment commensurate with the level of transactions in the business. The business seeks to ensure that on the shop floor production does not get stalled for want of materials, etc. and sales do not suffer on account of non-availability of finished goods.

The precautionary motive is also at work. Inventories are held so that there is a cushion against unpredictable events. For instance there may be sudden andunforeseen spurt in demand for finished goods or there may be sudden and unforeseen slump or delay in supply of raw material or other components needed for production. An enterprise would surely like to have some cushion to tide over such situation. - Inventories may also be held so that advantage can be taken of price fluctuations. For instance, if the price of a particular raw material is expected to go up

customer	Rcv Date	Reference Num	Aging	Item	Description	QTY	MLabel	location	Lot Number
Nextracker	5/5/2020	TRLU7435738	184	2054	'Slew Drive Mount Assembly, v4'	62	11T4538	62-26-01	1
Nextracker	5/6/2020	DRYU9664127	183	2054	'Slew Drive Mount Assembly, v4'	120	11T4551	65-33-01	1
Nextracker	5/6/2020	DRYU9664127	183	2054	'Slew Drive Mount Assembly, v4'	120	11T4552	65-33-01	1
Nextracker	5/6/2020	DRYU9664127	183	2054	'Slew Drive Mount Assembly, v4'	34	11T4553	64-49-01	1
Nextracker	5/6/2020	DRYU9664127	183	2054	'Slew Drive Mount Assembly, v4'	120	11T4554	64-49-01	1
Nextracker	5/12/2020	PO 20244	177	2054	'Slew Drive Mount Assembly, v4'	75	21T3227	66-27-01	1
Nextracker	5/12/2020	PO 20244	177	2054	'Slew Drive Mount Assembly, v4'	17	21T3228	66-27-01	1
Nextracker	5/12/2020	PO 20244	177	2054	'Slew Drive Mount Assembly, v4'	120	21T3229	66-31-01	2
Nextracker	5/12/2020	PO 20244	177	2054	'Slew Drive Mount Assembly, v4'	120	21T3238	66-31-01	2
Nextracker	5/20/2020	PO20219 YMMU6197471	168	2054	'Slew Drive Mount Assembly, v4'	120	11T4718	62-44-01	2
Nextracker	5/29/2020	YMLU8860759 200614	160	2054	'Slew Drive Mount Assembly, v4'	7	11T4831	58-34-01	2
Nextracker	5/29/2020	YMLU8860759 200614	160	2054	'Slew Drive Mount Assembly, v4'	120	11T4832	66-74-01	2
Nextracker	5/29/2020	YMLU8860759 200614	160	2054	'Slew Drive Mount Assembly, v4'	120	11T4833	66-74-01	2
Nextracker	5/29/2020	YMLU8860759 200614	160	2054	'Slew Drive Mount Assembly, v4'	120	11T4834	65-53-01	2
Nextracker	5/29/2020	YMLU8860759 200614	160	2054	'Slew Drive Mount Assembly, v4'	120	11T4835	65-53-01	3
Nextracker	5/29/2020	YMLUX236435235 2023	160	2054	'Slew Drive Mount Assembly, v4'	11	21T3541	63-05-03	3
Nextracker	5/29/2020	YMLUX236435235 2023	160	2054	'Slew Drive Mount Assembly, v4'	120	11T4836	63-49-01	3

Conducting ABC Analysis: To conduct ABC analysis, following steps are necessary:a) Prepare the list of the items and estimate their annual consumption(units)Determine unit price (or cost) of each item. Multiply each annual consumption by its unit price (or cost) to obtain its annual consumption in rupees (annual usage). Arrange items in the descending order of their annual usage starting with highest annual usage down to the smallest usage. Calculate cumulative annual usages and express the same as cumulative usage percentages. Also express the number of items into cumulative items percentage. Graph cumulative usage percentages against cumulative item percentages and segregate the items into A, B and C categories. Decide the policies of control for the three categories.

6. Findings

1. It is found that some items are misplaced.

2. Keeping every item in its assigned place.

3. It is found that there are some codification errors.

4. Easy and prompt issue and receipt of items.

5. Keeping items in an orderly fashion.

6. Providing production against damage and pilferage.

7. Issuing oldest material first Inventory is managed by ABC analysis, problem is occurred as stock of A items is less as it carries more amount, Sometimes if Supplier is not available at time of requirement of A items it may lead to stop whole production line also. 9.Inventory is managed following ABC analysis;it is based on monetary value of the items in use. So the other important factors one ignored.

10. Providing enough space and storage equipment like alarmist, shelves, racks, bins etc.

11. Having regular programmer of inspection, physical verification and maintenance of Store.

12. Employing and training reliable men in store.

13. Keeping records and inventory of store up to date above are the importance recommendations.

7. Conclusion-

To study the role/importance of Inventory system in relation.Today's market is a customer oriented market and customer satisfaction is the most important goal of every organization therefore it is inevitable to adopt integrated Inventory Management approach for new product development strategy. Financial – Material management for any product is a dynamic decision making process involving a series of inter-related activities.

In today's dynamic market "Every Bench marks are dynamic, challenge them for continual improvement". In order to remain in market any organization needs to define the process, Benchmark for the excellence, endeavor to achieve it by strategizing & creating environment, providing required resources & effective monitoring.

Inventory system is an extremely important problem area in the management of materials handling. It is quite susceptible to control and a very large amount of scientific models are

available in the literature to enable us to choose an optimal inventory policy. Buying the optimal quantity can result only from a sound inventory control system that is achieved by judicious reconciliation of conflicting costs and departmental objectives. However, inventory is only an indicator of performance of materials management function and to cut down inventories we use not only scientific inventory management principles but also models along with it also take long-term measures to reduce inventories through strategies such as variety reduction and standardization, source development and optimization, and vendor rating, lead-time reduction through improvement in the systems and procedures of procurement. It is obvious that scientific inventory management has to be practiced selectively rather than indiscriminately to make it cost-effective. It is also important to have

Informational inputs like demand forecast, lead-time estimate, and other cost estimates to be realistic to make effective use of inventory models.

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Artificial Intelligence in our Daily Life

Harsh Nath Pandey, MCA-II, DYPMIR,

Dr. Shikha Dubey, Asso. Prof, DYPIMR

Abstract: -"Artificial intelligence in today's world is progressing rapidly with new advanced innovations day in day out. Today's computer systems are designed to perform small tasks, for instance, facial recognition, car driving, and performance of other minor duties. However, the primary goal of artificial intelligence is to develop advanced and more complex systems that would outperform humans at whatever way."

This includes the performance of more complicated tasks like playing chess and solving equations. Therefore, the future goal of AI is to perfect all human activities and provide better solutions to problems than the human can do.

In the long term, an automated system that does all the human functions from controlling cars to computerized business systems will pose several challenges. More so, in preventing the development of lethal arms that significantly harm humans once they are used to attack. As a result, the development of super AI that undergoes self-improvement, triggering intelligence explosion would leave the human intellectual capacity by far.

I. Introduction

Technological developments have significantly advanced since the 1990's with more significant improvement in the way people perform different tasks (Frey and Osborne 2017). The concept of AI as an area of science was closer to fiction. However, the idea of AI is no longer a fiction but a reality that has become part of our daily lives. Therefore,' machine learning' by use of neural networks that mimic the actual processes of the real neurons, AI allows machines to process complex data and provide accurate information (Iqbal et al. 2016). With the innovations and development of AI, it marks the golden age of AI.

As a result, the AI has been the most advanced technology. Hence, it will dominate the focus of technology for many years. It is important to note that with the AI, people's lives have been improved for the better. Notably, integration of AI technology has a great connectedness in improving the people's activities in their everyday life.

II. Literature Review

The application of GPS during the long drives and trips, to the use of smartphone technology are good examples of the role AI has played in people's lives. With AI, there has been the minimal occurrence of errors especially when typing since the computers can predict what we are going to write and make corrections to wrongly typed words.

That is a clear example of an AI machine at work. Additionally, whenever people are uploading pictures on social sites, the AI algorithm identifies the person and tags them (Smith & Eckroth 2017). Furthermore, the knowledge of AI is well utilized in the banking and financial institutions to manage and organize statistical data accordingly. Utilization of AI technology has reduced the number of errors and increasing the chances of achieving accuracy.

III. Objective

The objective of the research is to provide the better,many industries are using human technology in the development of machines that perform human activities.

These tools create consistency in the rate of production with efficiency and effectiveness assuring the management of quality work.

Additionally, AI is used in companies in management system where they are used to keep employees' records, extract data that helps in decision making. Majorly, the role of AI has enabled processing and production industries to complete their tasks in good time and enhance business development.

Time is of great essence in today's world, and people are willing to develop machines that help in saving time.

IV. Methodology

The research was carried out concerning the research subject. Numerous consultations were carried out from the previous academic research, books, and journals that relate to the issue. Therefore, the study embraced the form of a new analysis based on the previous research on the subject.

The development of a super AI will mark the greatest invention in the human history. Consequently, the invention of more advanced technologies has significantly helped in war eradication, proper means of fighting diseases and developing appropriate prevention measures. Furthermore, advanced technology would much help in fighting against poverty.

V. Result

According to the survey,the majority of the people understand the importance of AI and the role it has played in enhancing their lives. From the chart above, 59% of the people agreed that AI had greatly influenced their lives, 24% failed to recognize the role played by AI and 17% did not know whether it had played any part or not.

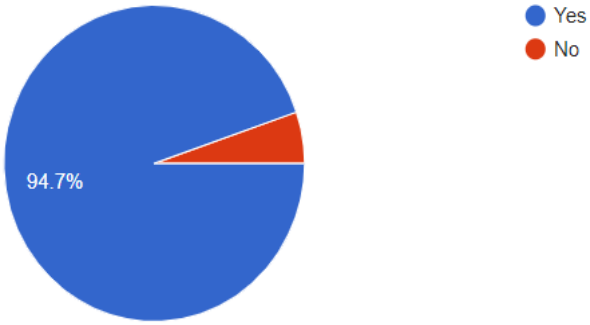

Fig 1: Survey for A I

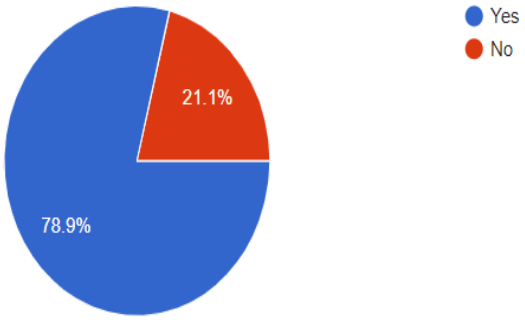

Fig 2: Experience at Online Stores and Services

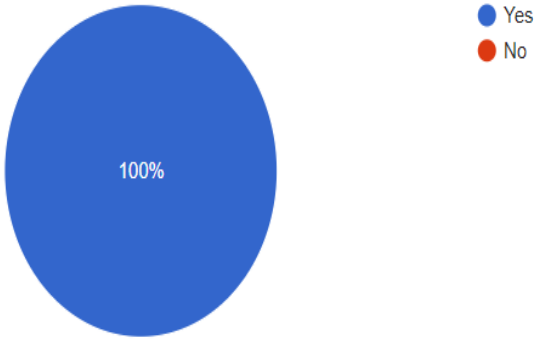

Fig 3: Artificial Intelligence Improves Social Media

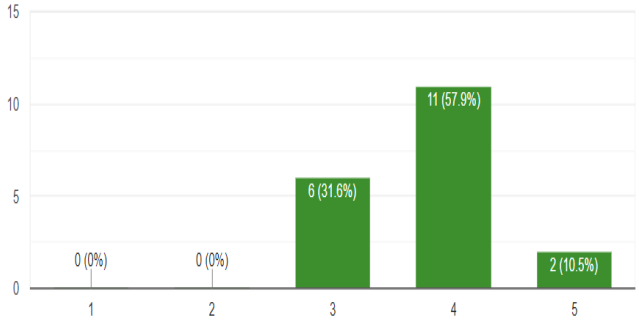

Fig 4: rate the your Experence about A I in our daily Life

Survey Title	Percentage Data (%)
A I Users	> 95%
Experience about A I Services	> 70%
A I use in own life	>95%

Table 1.0(Analysis Data)

The AI technology can do so far more than humans can do. Also, with AI, repetitive tasks have been eliminated which human spend much time trying to remove. Through AI, employees no longer work on repetitive tasks but instead concentrate on more complicated issues. Therefore, AI has brought about changes that have significantly improved on our daily lives.

VI. Conclusion

In conclusion, artificial intelligence has substantially improved on people's lives in different ways, and people are not the same as before the introduction of AI. As discussed above, implementation of AI has led to time-saving which in turn has led to increased output from the businesses and day to day human activities.

Moreover, development of AI has directed to the reduced human effort, computerized methods, automated transport system and involvement in dangerous jobs. Evidently, AI has dramatically influenced the people's lives and done wonders to help in the automation process

of almost all their activities. Much of these methods take a lot of time and manual labour to complete. With AI automation of these processes will contribute a lot to the actual activities of the people and industries and enable moving forward.

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Smart Communication through Internet of Things (IoTs) with reference to Solid Waste Management System

Sushant Shinde , MCA-III, DYPIMR
Sourabh Rode, MCA-III , DYPIMR
Dr. Rupal Choudhary , Asst. Prof ,DYPIMR

ABSTRACT - The aim of this paper is to develop a smart bin which can monitor waste through sensors and gives the information in detailed which are connected to internet. Initially all the sensors from different location (in bin) are connected through Internet in every location sensors will measure and calculate the waste and information will be sent to the server. At Server it will Process the information and send it to the concern Authorities and users to take necessary action. By This approach we can get information of bin by using an android app also.

This is also a gamified portal for the citizens to motivate about waste management. It is like clean and earn type situation.

KEYWORDS: IOT, Sensors, Waste Management, Micro Controller.

1. INTRODUCTION

In Smart Cities, waste generation is increasing due to rapid growth of people and industries in urban areas. The biggest problem to authorities is collection of waste from different locations such as Houses, Public Places and Industries.

Budget is spent on waste collection and transportation. To overcome this problem we need a smart solution which provides mechanism to monitor waste management process and gives the complete information to users and authorities by this full-fledged solution they can easily solve the waste management problem in a well-organized manner.

This is an innovative mechanism introduced to make people more aware about maintaining a better hygiene and motivating them to throw garbage in the bin.

Initially, user or citizen have to download the android application and do registration.

After that user will go for dumping the garbage user will see the 3-in-1 combo bin.

Whenever, the person comes in the range of PIR sensor the lid of the bin will be open.

After that the person should dump the garbage in right section of bin. There are 3 sections dry, wet and sanitary.

After dumping the garbage the load cell (sensor of weight) will calculate the weight of the garbage. Using the recorded weight the microcontroller will generate a QR code on the screen placed on bin.

After that, user have to open the smart bin android app and scan the visible QR code.

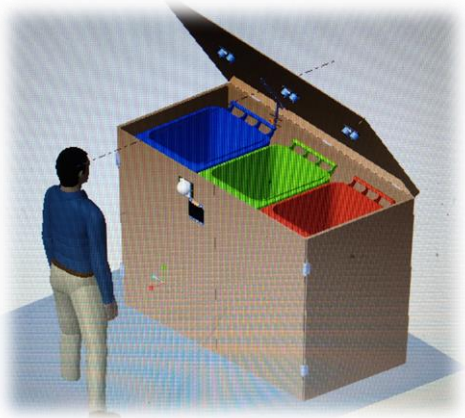


Fig 1.0: Idea Preview

Depending upon the weight of garbage and frequency of the user using the bin, user will get exciting rewards.

Biodegradable bags with color codes helps to identify types of waste and keeps it segregated while collecting as well as dumping the garbage.
On the other hand, authorities can monitor the level of bins with their location using the android app.

Our Designed algorithm will monitor bin located in different location and will give the Real-time status of the bins. If any of the bin exceeds the threshold limit then the alert will be sent to the concerned authorities. Authorities will get notification along with location and information of particular bin whenever it is going to be full.

1.1 INTERNET OF THINGS

Connecting embedded electronic devices through a medium Internet is called Internet of things. It can be implemented with four steps Computing, Programming, Interfacing, and Networking. In Computing we can Use either Microcontrollers or Microprocessors such as Microcontrollers (8051, AVR, Arduino) and
Microprocessors (RaspberryPi) Application of either board will depend upon the User Requirement and Programming. It is also related to the device using Embedded C/C++ Programming for Microcontrollers and Python programming for Microprocessors like raspberry In Interfacing user can use any type of electronic devices or sensors either analog or digital sensors and last Networking will Play Vital role in IOT(Internet of things).

Fig 1.1: Internet of Things

1.2 ARDUINO

Arduino is a low cost small ATM card sized computer having functionality related to other computers and it is working on low 5v power supply and designed by the Arduino Company.

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on Processing.

The Official Arduino Mega 2560 is Rev3 development board based on ATmega2560 microcontroller. The board has 54 digital input/output pins (of which 14 can be used as PWM outputs), 16 analogue inputs, 4 UARTs (hardware serial ports), a 16MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button.
It contains everything needed to support the microcontroller, simply connect it to a computer with a USB cable or power it with an AC to DC adaptor or battery to get started.

Fig 1.2: Arduino Board

Applications: Embedded Design & Development, Industrial, Communications & Networking, Sensing & Instrumentation, Automation & Process Control

Features:
-ATmega16U2 instead 8U2 as USB to serial converter
-1.0 pinout
-Stronger RESET circuit
-5V operating voltage
-Input voltage (recommended) range from 7V to 12V
-Input voltage (limit) range from 6V to 20V
-40mA DC current per I/O pin
-256KB flash memory of which 8KB used by bootloader
-8KB SRAM
-4KB EEPROM
-In this project this microcontroller is used to manage all sensors.

1.3. ULTRASONIC SENSOR-HC-SR04

Ultrasonic Sensor is used to calculate distance between object and sensor by sending a sound wave at specific frequency to reflect back. The time taken being sound wave generated and bouncing back is possible to calculate the distance between sensor and object and time taken by pulse is actually for to and from travel of ultrasonic signals thus time taken as Time/2.

Distance = Speed*Time/2

Fig 1.3: Ultrasonic Sensor

Features :

1. Measures the distance within a wide range of 2cm to 400cm
2. Stable performance
3. Accurate distance measurement
4. High-density
5. Small blind distance

In this IOT project we are using this Ultrasonic Sensor for measuring the level or status of bin.

1.4 PIR SENSOR

Passive Infra-Red (PIR) sensor plays a primary role in the circuit that is detecting the human being. PIR sensors work on the principle that they every human being emits infra-red radiations of very low wave length. Thus this sensor senses these radiations and outputs a logic high value. This sensor can sense the human within the range of 20 feet. PIR sensor can be connected to the Port1 of the micro controller. It's operation range is 2.2V – 5V.

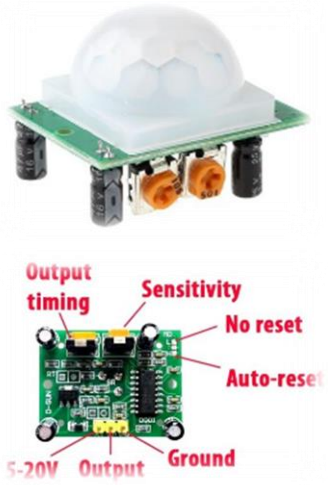


Fig 1.4 PIR

Features-

1. Infrared Sensor with Control Circuit Board
2. The Sensitivity and Holding Time is adjustable.
3. Blockade time: 2.5s (Default)
4. Sensitive Setting: Turn to Right, Distance Increases (About 7M); Turn to Left, Distance Reduce (About 3M)
5. Time Setting: Turn to Right, Time Increases (About 200S); Turn to Left, Time Reduce (About 5S).

1.5 LOADCELL SENSOR WITH HX711

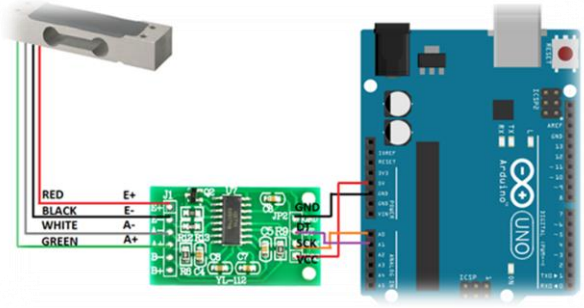


Fig. 1.5 Loadcell

This straight bar load cell (sometimes called a strain gauge) can translate up to 10 kg of pressure (force) into an electrical signal. Each load cell is able to measure the electrical resistance that changes in response to, and proportional of, the strain (e.g. pressure or force) applied to the bar.

With this gauge, you will be able to tell just how heavy an object is, if an object's weight changes over time, or if you simply need to sense the presence of an object by measuring strain or load applied to a surface. This straight bar load cell is made from an aluminium alloy and is capable of reading a capacity of 1KG of weight

It has Four lead wires which can be connected to HX711 A/D Pressure Sensor. It is easy to use with driving voltage 5-10V and produce the output voltage as per the force changes over it.

In this project the loadcell used to calculate the weight of garbage.

1.6 SERVO MOTOR

Servo Motor is used to open the lid or top door of bin whenever the human is detected by PIR then the lid of the bin will open by using servo motor.

1.7 OLED SCREEN

0.96 inch Yellow/Yellow blue OLED LCD LED Display Module have Resolution of 128X64 and Viewing angle greater than 160 degrees. It is compatible for Arduino

Fig.1.7 OLED screen

This screen is used to display the QR code generated depending upon the weight of the garbage.

Features:

1. Better quality
2. The IIC address can be changed, it is convenient to use with different machines.
3. Four square holes are easy to install

1.8 SIM800L MODULE

Fig.1.8 SIM800L

This is Small SIM800L GPRS GSM Module Micro SIM Card Core Board Quad-band TTL Serial Port with the antenna, in this module two antennas have been included.

SIM800L GSM/GPRS module is a miniature GSM modem, which can be integrated into a great number of IoT projects. You can use this module to accomplish almost anything a normal cell

phone call SMS text messages, make or receive phone calls, connecting to the internet through GPRS, TCP/IP, and more! To top it off, the module supports quad-band GSM/GPRS network, meaning it works pretty much anywhere in the world.

1.9 BREADBOARD

A breadboard is a rectangular plastic board with a bunch of tiny holes in it. These holes let you easily insert electronic components to prototype (meaning to build and test an early version of) an electronic circuit, like this one with a battery, switch, resistor, and an LED (light-emitting diode). Breadboards comes with three sizes full, half and mini.

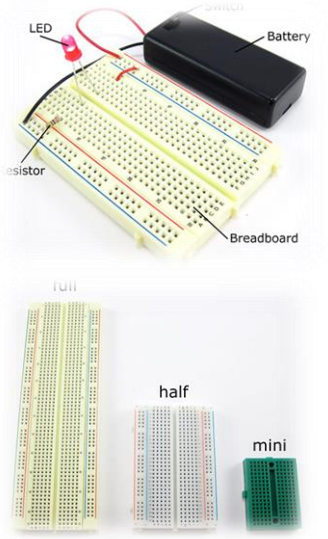


Fig 1.9: Breadboard

The leads can fit into the breadboard because the inside of a breadboard is made up of rows of tiny metal clips. When you press a component's lead into a breadboard hole, one of these clips grabs onto it. Most breadboards have some numbers, letters, and plus and minus signs written on them. What does all that mean? While their exact appearance might vary from breadboard to breadboard, the general purpose is always the same. These labels help you locate certain holes on the breadboard so you can follow directions when building a circuit. If you have ever used a spreadsheet program like Microsoft Excel® or Google Sheets™, the concept is exactly the same. Row numbers and column letters help you identify individual holes in the breadboard, just like cells in a spreadsheet.

2. DATABASE

Database is the place where we can get collection of information in well-organized manner and it will be stored in rows, tables, columns and indexed to make easy access for the relevant information. In this paper we used MySQL or phpmyadmin database to store the values of every bin pointed from different locations and we had created ids related to bin which gives garbage level information to store in database for the further process. The microcontroller is used to get the garbage level information pointed in different location connected to the database. It is used to store the bin data or sensors data and using them we can perform some operations. In this project you can make a database for website and manage the system through web by using HTTPS request and response. And for mobile application using same database server and by using API.

The database is the strongest backend part of this project that will store all of the bins and user related information, especially, how user interacting and generating data. To manipulate the data we use SQL.

DDL, DML commands

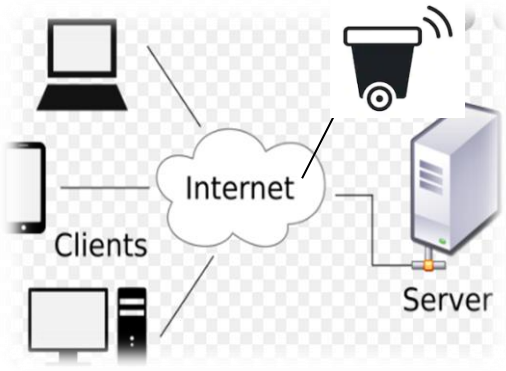


Fig.2 database server

3. WASTE MANAGEMENT

Fig.3 waste management

The Arduino based bin is connected to internet by using GSM module, website and mobile app which will use same database. The user will interact with the bin and the details of the user and weight of that garbage will be stored in the database. By using the recorded data, user account is managed and it helps to keep the track of user details in the database and generate rewards.

Garbage collectors gets the notification along with location and state of bin when the bin is going to be full.

The citizen or user also have a option that he can click the photo of overflowing garbage in the area and send to the authorities using android app.

If multiple bins are going to full then garbage collector can see the optimum collection path in map so that its easy for him to collect the garbage.

IoT can greatly optimize collection services and reduce operational costs for cities, transitioning waste management into data-driven collection processes. Waste collection is an essential city service, yet existing waste management systems are resource-intensive, inefficient, and outdated. The Internet of Things (IoT) has the potential to greatly optimize collection services and reduce operational costs for cities.

4. REVIEW OF LITERATURE

1. Sehyun Park in his paper 'IoT-Based Smart Garbage System for Efficient Food Waste Management' in the 2014 mentioned that collection path will help the garbage collector to collect effectively.

2. Alessandro Pozzebon in his paper' A Low Power IoT Sensor Node Architecture for waste Management within Smart Cities Context' in the 2018 mentioned about importance of low power and cost effective sensors.

3. P.A.Thole in his paper 'IOT based smart waste management system' mentioned that how GUI is useful.

4. Leena Sharma in her paper Smart Waste Management System using RFID in 2020 mentioned that idea of Smart City implements multiple microcontroller based hardware system which help in better utilisation of resources.

5. A. D. Gole in his paper Smart Waste Management System for Industry in 2019 mentioned that System will also be providing the current location of full dustbins.

6. Using GPS, find out the location of trashcan and a mobile user.

7. The system is simple. If there is any problem with any equipment in the future, that part is easily replaceable with new one without any difficulty and delay.

8. Improving proper waste management will reduce pollution, recycle useful materials and create more green energy.

3. RESEARCH OBJECTIVES

To use IOT with reference to waste management and overcoming challenges.

To explore how IOT solution can affect Cost, Time and help in data – driven decision.

To analyse the in-depth flow, features of system and the impact of motivating the citizens through IOT system.

6. RESEARCH METHODOLOGY

To analyse and find the effectiveness of smart Communication in smart waste management done with the survey method. Ultrasonic sensor-used to check the level of bin.

-load cell to check weight of the garbage.

-GSM module-transfer notification to authorities

-Database stores all details of system.

-Servo motor open the lid of the bin.

-Arduino microcontroller manage all the sensors.

6.1 Secondary Data

-Books

-Journals

-Social Network and Internet.

6.2 Data Collection and Analysis

Collection-

-The data is collected using the online surveys and telephonic interviews.

-In which the simple questions there asked that how the waste is segregated and how to develop efficiency.

-Online surveys are very helpful and easy to take response. And there is no time restriction on online platform.

-Social Network is also best and fast for feedback and surveys.

Analysis-

-Analysis is done by studying languages, images and observation of collected data.

-Analysis helps to find out better solution for Various problem statements.

7. EXISTING SYSTEM

In the existing system garbage is collected by corporations by their own timetable. Sometimes the garbage level increases due to delayed collection and cause overflow of waste. It spreads over the roads and pollutes the environment. The smell will be heavy, affects the scenic beauty and spreads diseases. Not only humans but the street dogs and animals consume the waste food, plastic which results to their death .The waste spreads over the area and creates a unhygienic environment to avoid such situation IOT Based Smart Garbage Management For Smart Cities is proposed.

Disadvantages of existing system :

- Time Consuming.
- Less effective: it is possibility that sometimes the collector vehicle go when there is bin full or not.
- Unhygienic.

8. PROPOSED SYSTEM

In this smart proposed system there are multiple bins for various locations each bins will have their own circuits with the various sensors such as micro-Controller, Ultrasonic, Servo, GSM or WiFi Module.

We can use the bin anywhere such as public places and homes. We can also use the existing bins With our embedded component to ensure Re-usability. Which helps in tracking the level of the garbage bins and a unique ID will be provided for every dustbin in the city so that it is easy to identify which garbage bin is full. When the level reaches the threshold limit, the device will send alert along with the unique ID provided. These details can be accessed by the concern authorities from their place with the help of internet and an immediate action can be made to ensure hygiene and step towards smart city.

Advantages of this proposed system:

- Real time information.

- Cost Effective.
- Install based on the actual needs.
- Time Effective.
- Intelligent Management.
- Provides Hygiene.

9. CHALLENGES AND SOLUTIONS

There are lots of ups and downs in this project we have learned best practical knowledge during the execution of the project.
The making of this project had some challenges and solutions.

9.1 CHALLENGES

1) **No Prior Knowledge or No Pre-Requisites**
   Initially, we did not have any hardware skills and knowledge that how the sensors, microcontrollers and breadboard worked.

2) **Self-Study:**
   Wireless sensors networks once deployed should be in a position to work with none human intervention. It should be in a position to manage the network configuration, adaptation, maintenance, and repair by itself.

3) **Security:**
   Confidentiality is required in sensing Elements. The networks are needed to be secure for transferring the data between the sensor nodes of the network or between the sensors and the base station. Otherwise it may lead to eavesdropping on the communication. In sensor networks, It is essential for each sensing element node and also the base station to possess the ability to verify the info received was really sent
   by a trusted sender and not by a human that tricked legitimate nodes into accepting false knowledge.

4) **Quality of Service (QoS):**
   The quality of service is the level of service provided by the sensors and networks to its users.

5) **Fault Tolerance:**
   Sensor network ought to keep functional even if any node fails whereas the network is operational. Network should be in a position to adapt by changing its property in case of any difficulty.

6) **Limited Memory and Storage Space:**
   A sensor is a tiny device with only a tiny low quantity of memory and storage space for the code. In order to make an effective security mechanism, it is necessary to limit the code size of the security algorithm.

9.2 SOLUTIONS

1) **Data Freshness:**
   Even if the data integrity is assured, there is a desire to make sure the freshness of every message.
   Informally, knowledge freshness suggests that the data is recent, and it ensures that no old messages have been replayed.

2) **Installation:**
   Utility of a device network can trust on its ability to accurately mechanically find every sensor within the network. A sensor network designed to find
   faults can would like correct location data in order to pin purpose the placement of a fault.

3) **Data:**
   The availability of the data produced by the network of developed circuit which helps to improve the logic and maintenance.

10. MINI PROTOTYPE EXAMPLE RESULTS AND DISCUSSION

Here is the small prototype example which will introduce you in Part 1 and Part 2 to how the IOT helps to build such kind of projects.

Hardware used :

- Arduino Microcontroller
- Ultrasonic Sensor
- Servo Motor
- ESP8266 or NodeMCU
- Jumping Wires

Software used:

- Arduino IDE

Programming Languages:

- C/C++ for in Arduino IDE.
- PHP for web request and response.
- SQL for database manipulation.

10.1 PROTOTYPE PART 1

In this part 1 you will understand that how the connections implemented using sensors.
And how the microcontroller collect data from sensors (ultrasonic, servo) and use it for some action. You understand in this part that how the ultrasonic sensor is used with the Arduino to check the incoming object and open the lid or top door of the smart dustbin.
First of all we need to make the connections of ultrasonic sensor and Arduino microcontroller.

Check the below diagram for reference that how the microcontroller is connected to the ultrasonic sensor using some jumping wires.

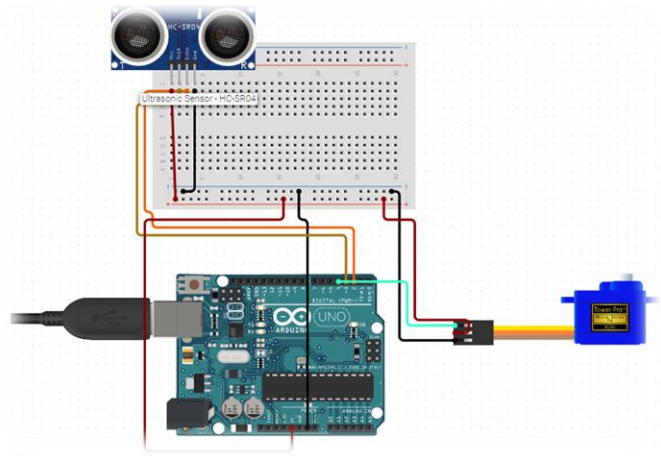


Fig.8.1.1 Ultrasonic and Servo to Arduino

For more details information that hoe to plug the jumping wires correctly then use this below link for reference:

https://www.circuito.io/app?components=512,11021,13959,2345678

Now use the Arduino IDE and refer this code to execute the functionalities

Code:

```
#include <Servo.h>
#define trigPin 8
#define echoPin 9
#define sigPin 10//Servo Sig

long duration;
float distance;

Servo myservo;
int pos=0;
int userPIN=5055;
int timeout=10000;
void setup() {
  // put your setup code here, to run once:
  Serial.begin(9600);

    Serial.println("started");
    myservo.attach(sigPin);
    pinMode(trigPin,OUTPUT);
    pinMode(echoPin,INPUT);
    myservo.write(pos);

}

void loop() {
  // put your main code here, to run repeatedly:
  digitalWrite(trigPin, LOW);
    delayMicroseconds(2);
    digitalWrite(trigPin, HIGH);
    delayMicroseconds(10);
    digitalWrite(trigPin, LOW);

    duration = pulseIn(echoPin, HIGH);
    distance = 0.034*(duration/2);
    //Serial.println(distance);
      if (distance < 27)
     {
       //digitalWrite(led,HIGH);
        myservo.write(pos+180);
        //delay(1000);
```

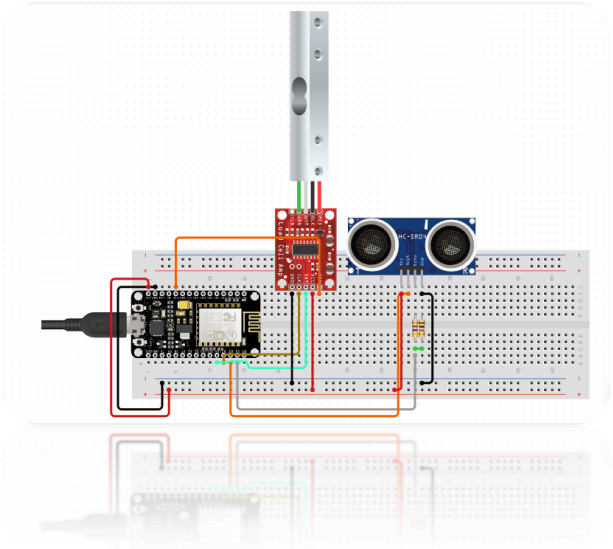
```
    }
    else
    {
      //digitalWrite(led,LOW);
      myservo.write(pos);
    }

}
```

Output:
After attaching all parts to the dustbin and running the program you will see that how lid of the bin will open automatically when the object is come in front of ultrasonic sensor.

Fig.8.1.2 Output
Above images shows the structure of components used. Servo Motor is placed inside the bin with lid of the bin to open whenever the object is come in range of the ultrasonic sensor. The object is anything currently we use it as a human hand.

10.2 PROTOTYPE PART 2

In this part you will understand that how we used the Sensors with NodeMCU. And how the data flow is done with web server side. In this part we use
ultrasonic sensor as to check the bin is going to full
or not if the garbage is reach to a threshold limit then
a SMS notification will be sent to the collector or authorities.
I also used a loadcell sensor which is used to calculate the weight. Here the loadcell used to calculate the weight of the garbage dumped by user.
And the ESP8266 or NodeMCU is used here to use internet using wifi and to send the collected data to the server. Below diagram is displays that how the circuit and connections implemented to achieve the desired output.



Fing.8.2.1 NodeMCU with Loadcell and Ultrasonic

Source or reference link:

https://www.circuito.io/app?components=513,13879,13959,360216

you can use above link for more information that to refer how sensors are connected and which wire is connected for which breadboard location for data flow.

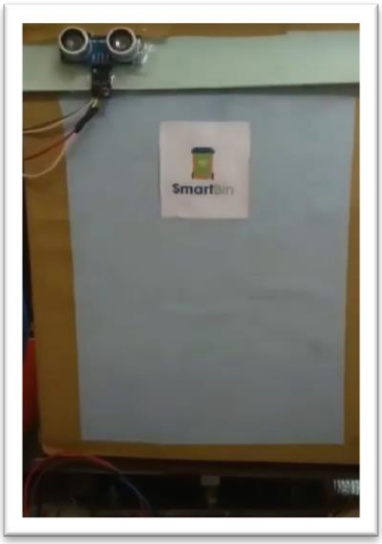
Code:

```
#include <ESP8266HTTPClient.h>
#include <ESP8266WiFi.h>
#include <WiFiClient.h>
#include <ESP8266WebServer.h>

const char* ssid = "Your wifi name";
const char* password = "wifi password";
const char *host = "yourserverORwebsite ";

#define trigPin D1
#define echoPin D0


long duration;
float distance;

void setup() {
```

```
  Serial.begin(9600);

   Serial.println("started");
  // We start by connecting to a WiFi network
  Serial.println();
  Serial.println();
  Serial.print("Connecting to ");
  Serial.println(ssid);

  WiFi.begin(ssid, password);

  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }

  Serial.println("");
  Serial.println("WiFi connected");
  Serial.println("IP address: ");
  Serial.println(WiFi.localIP());


  //If connection successful show IP address in serial monitor
  Serial.println("");
  Serial.println("Connected to Network/SSID");
  Serial.print("IP address: ");
  Serial.println(WiFi.localIP());


    pinMode(trigPin,OUTPUT);
    pinMode(echoPin,INPUT);


}

void loop() {

    digitalWrite(trigPin, LOW);
    delayMicroseconds(2);
    digitalWrite(trigPin, HIGH);
    delayMicroseconds(10);
    digitalWrite(trigPin, LOW);

    duration = pulseIn(echoPin, HIGH);
    distance = 0.034*(duration/2);
    //Serial.println(distance);
      if (distance < 27)
     {
        delay(2000);
        Serial.println("Alert..!!  SmartBin is full..!");
        //send SMS:
        Serial.println("Sending Alert..!");
        HTTPClient http;    //Declare object of class HTTPClient

  String mobilevalueSend, postData;
  Serial.println("Enter Your Mobile no:");
  while(Serial.available()==0){}
  String i = Serial.readString();  // get mobile no

  Serial.print("Your Mobile no is :"); // print out to LCD or serial

  Serial.println(i);
  mobilevalueSend=i;

  //Post Data
  postData = "mobile=" + mobilevalueSend;

  http.begin("http://<yourhostname>/sms.php"); //Specify request destination
  http.addHeader("Content-Type",  "application/x-www-form-urlencoded");    //Specify content-type header

  int httpCode = http.POST(postData);   //Send the request
  String payload = http.getString();      //Get the response payload
  Serial.println(httpCode);     //Print HTTP return code
  Serial.println(payload);    //Print request response payload
  //        Serial.println("Load        Value="        + loadValueSend);

  http.end();  //Close connection */
   Serial.println("SMS Send Successfully..!");

  }
     else
     {
      delay(2000);
      Serial.println("SmartBin works properly..!");

     }

}
```

OUTPUT:

Below Figure of smartbin shows the loadcell placed at the base of the bin to calculate the weight of the garbage dumped by the user.



Below is the output snapshot of data from the website that displays the data.

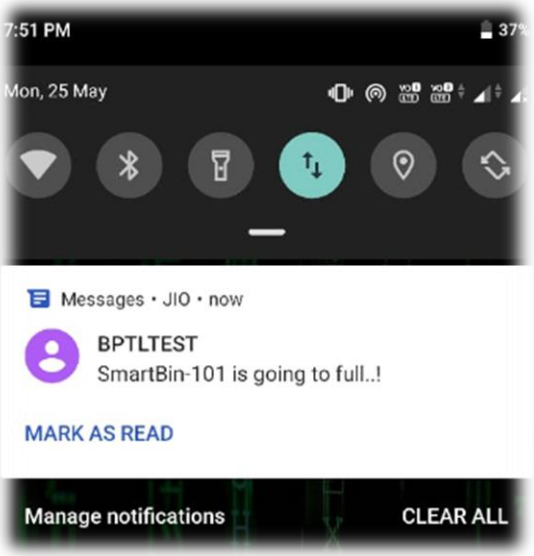
LoadCell NodeMCU ESP8266 MySQL Database

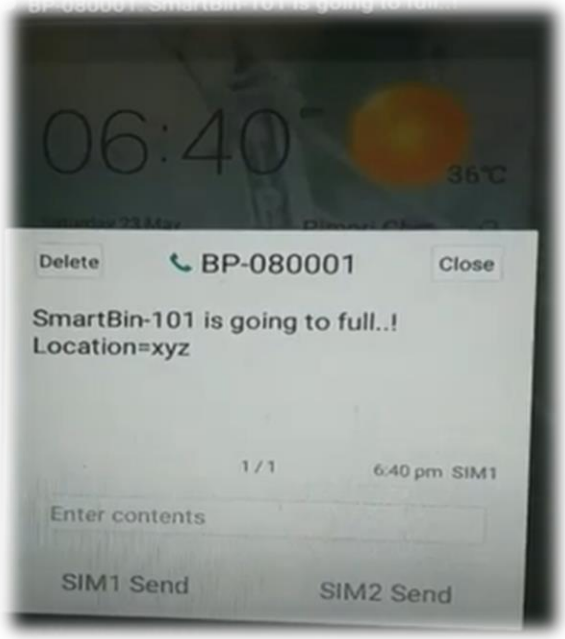
ID	LoadCell Value	Date	Time
1	100	2020-10-14	11:45:00
2	186	2020-10-14	11:45:10
3	200	2020-10-14	11:45:13
4	200	2020-10-14	11:45:17

Fig.8.2.2 Data from server

The next output shows that how the SMS notification gets when the garbage limit reach to particular threshold limit of bin.
Here we use the ultrasonic sensor inside the bin to check the bin fill or not.The SMS will be sent by using third party service SMS API that webpage is store on server as sms.php

Ultrasonic to check threshold limit





SMS notifications

Above two snapshots shows that SMS notification gets when the garbage reach to the particular threshold limit.

11. CONCLUSION

Hence, we tend to conclude that, by implementing this project we will determine the level of smart bins and give indication to authority or collectors whenever it is necessary. And this project work is the implementation of smart waste management system using various sensors, with microcontroller and GSM or Wi-Fi module.
This project also provides a gamified solution to the citizens to motivate themselves to maintain proper hygiene.

10. LIMITATIONS

- Internet is essential for communication between device and server.
- Need for Power Supply

12. TOPICS FOR FURTHER RESEARCH

Smart dustbin helps us to reduce the pollution. Many times garbage dustbin is overflow and many animals like dog or rat enters inside or near the dustbin. This creates a bad scene. Also some birds are also trying to take out garbage from dustbin. This project can avoid such situations.
There are lot of work we can make this project better in future.

12.1 Solar System:

We can use the solar system instead of a battery
for more convenient And cost effective that will
supply power regularly to the device.

12.2 Artificial Intelligence:

We can also use some AI to make system more intelligent. And for data visualization.

12.3 Cloud Storage:

We can also use the cloud storage in future for this project to manage the lot of users of smart city.

13. REFERENCES

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The Editor
JBSR
Dr. D. Y. Patil Unitech Society,
Dr. D. Y. Patil Institute of Management & Research,
Sant Tukaram Nagar, Pimpri, Pune 411018. Maharashtra , India
Phone : +91 20 27421293
Editor E-mail Id : research.imr@dypvp.edu.in
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