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Efficient Waste Management System for Underprivileged Communities

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ABSTRACT

Nowadays due to increasing population the communities have also increased several times. Due to this the amount of waste generated has also increased. Proper management systems although available in metropolitan cities are generally missing from towns and villages. Therefore a proper management is required to tackle problems with waste dumping systems in those areas. Out of several available ways we in this project are dealing the above mentioned problem with the help of web based management system which would help in maintain schedule and lodging complaints regarding the waste collection from the houses that belong to these underprivileged communities.

This system is developed using React Js and asynchronous scripting with javascript at backend to ensure efficient working of servers and interaction with database. With the help of this project the process of waste collection will monitored and managed very efficiently by the waste management units of the local government in India.

KEYWORDS: *Mern Stack , Garbage Collection , MongoDB , ExpressJS , NodeJS , ReactJS.*

I. INTRODUCTION

Major human exercises produces waste. Despite that, the generation of wastes remain a major source of concern as it has always been. In recent times, the degree and quantity of waste generation have been on the surge. As the amount of wastes increases, so does the change of the waste increases . Dissimilar to the prehistoric period where waste was just a matter of mere annoyance , that was supposed to be disposed of proper management was not a chief issue as the human population was small and a very large amount of land was obtainable to the population at that time. In Historical times , the environment effortlessly absorbed the volume of waste formed without any form of deprivation .

In order to shield human well-being and the environment from the latent hazards of unfortunate waste disposal and environmental pollution a systematically supervised and controlled handling of these wastes is a must. The type of wastes which constitute environmental pollution which this work focusses on is domestic waste consisting of degradable food wastes, leaves, dead animals and non-degradable wastes such as the plastic , nylon etc.

Waste has been always repeatedly rising and has proven to be a problem at global as well as local levels. Due to this rapidly increasing production and ingesting, today's society generates waste material regularly which is very huge in amount . Most of this generated waste belongs to industrial , commercial and domestic wastes.

We can define the management of this waste as the controlled and monitored transport and processing of this waste in a manner that consensuses with public health , economy and conservation of environment.

II. Waste Management System

We do know that waste is the unwanted production of materials and as it sounds it definitely attracts less attention of technological advancements in this field . A heavy amount of effort is being put by the industrial , finance and medical sectors in this field but nothing seems to improve. Modern India generates 6.2 crore tonnes of waste annually, and it has been foretold that this will reach 16.5 crore tonnes by the end of 2030. 4.3 crore tonnes of municipal solid waste is also collected yearly , out of which only 3.1 crore is forsaken in landfill sites and just 1.19 crore ton is treated. There are not enough public bins anywhere, and the bins which are existing currently are not even covered by the lids and, waste overflows out of those bins and ends up clogging the streets . Many areas don't even have waste collecting vehicles which results in the spoiling of the streets in those areas . Many people in India irresponsibly spoil the boulevards too by throwing litter. Till a few years ago the citizens of India littered the streets with banana peels of vegetable scraps , now those varieties of litters were biodegradable so they were less harmful and could even be eaten by wandering animals. But in India today, what is majorly plagued is plastic and in any community, it's not very easy to bring a fast cultural change which is going to help nature.

Things can change even quickly if Indians can adopt the exercise of segregating waste in their houses, stop discarding mixed waste and stop littering. It is really disappointing to know that there are villages in India where plastic can enter, but never leaves. Even though many cities and states have banned the use of plastic bags, plastic still enters the isolated villages in form of fragments , small pieces and packets, water containers, etc. in those areas there is no machinery to recycle or collect plastic waste and trash, there is no facility by the supervision whatsoever to collect trash from those villages. As a result, many villages just unknowingly burn it or dump it in the open . The MSW (Management and Handling) Rules 2000 was issued by MoEF to ensure and guarantee proper waste management in India and new rationalized current rules have freshly been made available and rolled out. Civic authorities exist in India which are responsible for executing these rules and developing setup for collection , storage , segregation , transportation, dispensation and disposal of MSW . The first city in India to develop Solid Waste Management which is Chandigarh has improved waste management in comparison with other Indian cities.

Solid Waste dumping and disposal is at a very serious stage of progress in India . Solid Waste need to be dumped in a very efficient manner and facilities need to be developed for this purpose .It is believed that above 90% of waste is disposed off in a very bad manner. It is estimated that around 1350 km2 was occupied by waste dumps near the end of 1997 and this is believed to get an increment in the coming future , as shown below :

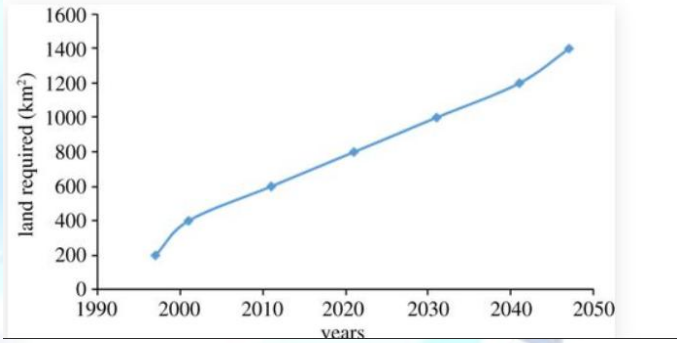

Fig 1. Cumulative land required for disposal of MSW . Source : www.google.com

III. Related Works

Troschinetz, (2005) identified 12 factors swaying sustainable reprocessing in developing countries, while considering the three dimensions of bearable environment, society, and economy. The factors were derived from quantitative and qualitative inspection of twenty-three case studies of developing countries.

Jayveer Singh (2015) believes that party-political determination is the first priority. Generally Government bodies and cities give precedence to existing problems which they face but do not think for forthcoming problems due to environmental deterioration. Their view is that, they will solve difficulties when they will face it but not now.

Because doing something for situation does not provide political gains or guarantee next time seat. Now question is that how can we change this attitude? We have faith that there should be a positive tactic for a effective time development and operation. Legislation and its effective prosecution is a key to sustainability for which the framework requires to be established. In order to make proper waste management action bear in true sense, following other opinions need to be given courtesy to –

1) Region specific planning: Looking at the topographical, physical and cultural assortment of the nation it can be divided into five regions such as European Scientific Journal June 2015 /SPECIAL/ edition ISSN: 1857 – 7881 (Print) e - ISSN 1857- 7431 125 Northern region, Eastern region, Western region, Central region and Southern region. Each of these regions has diverse construction. Hence all the doings should be prearranged & implemented on provincial basis.

2) Planning from below: To make Solid Waste Management a success in true sense, the development as well as enactment should start from general civic level planning followed by block level planning, region level development and municipal level planning.

3) Involvement of self help groups, youth groups and small magnates: The general public level waste management units can be run by self help assemblies, youth groups or small impresarios. This will help in making the programme self supportive and supportable.

4) Well planned and effective training policy: Technical drill at all levels forms the mainstay of a positive waste management and administration programme. Suitable training must be provided to all those backbone support preceding to actual introduction of the programme in the field.

Jennifer, (2005) led a practicability study and all-inclusive action plan for a large scale municipal composting operation at the Riverton disposal site in Kingston, Nigeria . The groundwork for this study came from the longing of the Government of Nigeria to participate waste reduction strategies into the existing solid waste management (SWM) system in order to dissuade compostable waste from the landfill.

IV. METHODOLOGY

We aim to tackle the above mentioned problem with the development of a web based app which would have all the necessary options to deal with waste management. The developed webApp could be deployed nationwide to help all the regions of India without any fail.

The data for this project will be collected locally with the help of the residents .

There are several tools or programming languages that could be employ for the development or design of a system but the choice of the programming language and tools used depend greatly on so many factors or conditions e.g. flexibility, goals of the system, ease of use, ease of understanding, targeted end users, size of the industry for which the system was proposed and lots more. The coding of this system was done using the MERN stack where M stands for MongoDB , E stands for ExpressJS , R stands for ReactJs and N stands for NodeJs.

This system supports database MongoDB which horizontally scalable in nature. It uses a local server which is used to serve HTML pages. NodeJs helps in maintaining the Runtime environment at the backend for running Javascript locally outside the browser . ExpressJs helps in creating the Http Server. This server controls the flow of data between the frontend and the backend . Below given image shows the system diagram for the waste management system .The staff of the local government would be able to enter the data of the areas .

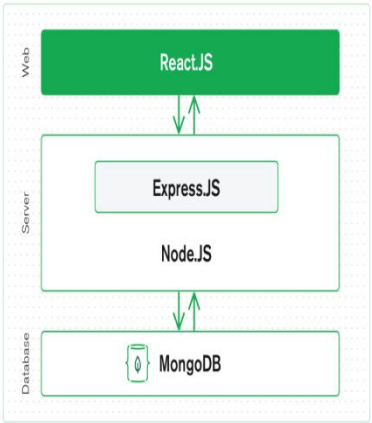

Fig 2 . MERN STACK DATA FLOW .
Source : https://www.google.com

The Home Page includes the login panel for the government staff as well as the community representatives . It also has a display panel for the timetable for the garbage trucks visit to a certain area . A complaint lodging section also exists on the

homepage where the local residents can lodge complaints .

Before logging in the Government officials and community representative would have to signup in the webApp.

After logging the government staff is able to view all the complaints and is able to monitor the schedule for the garbage pickup trucks. The Community Representative is able to register the area and enter all its details . There exists an input form where the representative can enter the details.

The Main Components Of this platform will focus on :

- Each and Every community is dealt independently with the help of a grievance portal which will be thoroughly analysed by the authorities at a definite time period.
- Each user can make its payment for the waste collection through the platform only.
- Status of every bin installed in the area can by checked easily by the regular user feedbacks on the portal.
- It will be very easy for someone to find their nearest bin easily in their corresponding area again using the user feedbacks.
- A live chat can also be performed with concerned authorities staff in case of any problematic situation immediately.

V. Result and Snapshots

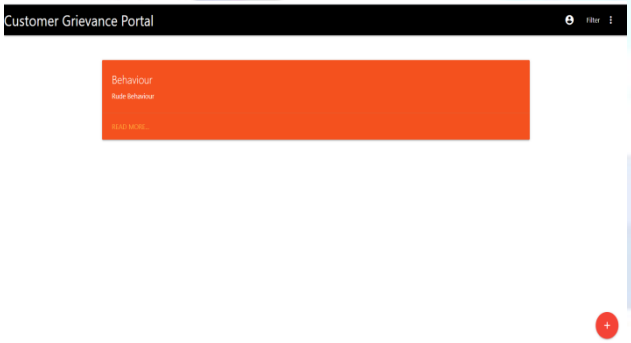

Fig 3. The Homepage where the admin will land using the secure credentials.

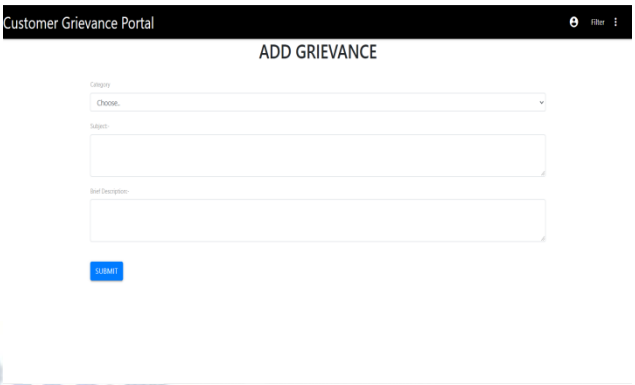

Fig 4. Webpage where the user might want to add the grievance as per their convenience.

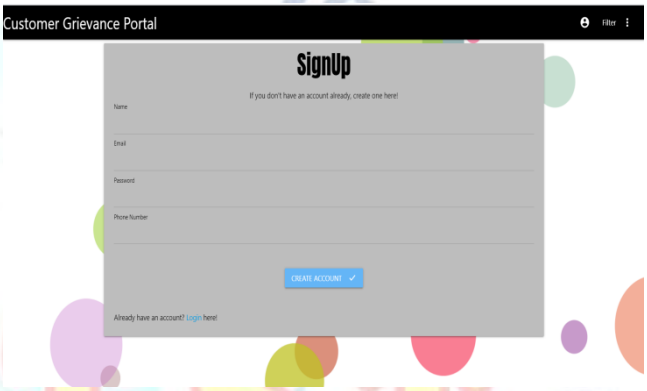

Fig 5. Signup Page for the Users and Customers.

VI. Conclusion

In conclusion this system helps the under privileged communities with the use of a simple web based management system which could be scaled to be used for the metropolitan cities . It helps the workers and government to systematically monitor the collection and transport of garbage from each area . This research basically emphasises on an efficient way to monitor the waste thereby conserving the environment . It provides a proper way of reporting the flow of waste from the residential area to the dumping site. All the above mentioned ways to tackle this increasing problem is given in reference to India and can only be improved if we all at our individual levels can make it happen.

Acknowledgment

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