

# GIS BASED APP ENABLED MONITORING SYSTEM FOR CLEAN SMART CITY

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Abstract: In line with national initiatives like "Swachh Bharat Abhiyan" and "Digital India" we here combine these two mottos to develop an innovative system that would take care of the issue of illegal garbage dumping. The system will be two ended where end users and the municipality / Admin happens to be the participants. Users can install our developed android application through which they can report the previously mentioned issues to the city municipality. The users can report their issues, and upload the picture of their inconvenience. The System shall automatically retrieve the coordinates of the location using Geographic Information System (GIS) with timestamp and upload the same to the server. The municipality / Admin can take action accordingly by allocating job online to the workers and monitor all the issues submitted by the users. Keywords: GIS, Garbage Dumping, Coordinates, Android Application, Smart City

# **1. INTRODUCTION**

The population strength of India is huge. That also makes India face certain problems. As urbanisation increased rapidly, the cities and places where humans inhabit started facing issues, which nobody has idea how to solve altogether. The issue is of shortage of places to live. To top it all many diseases started evolving and all these have a major cause that is improper garbage collection and disposal. Open garbage dumps and general lack of cleanliness or awareness is a problem. One can see open garbage dumps spewing trash all over and people spitting and defecating on the sides of major thoroughfares. It is not that the municipal corporation does not care; it is just that one department staffed by overworked humans cannot handle a million people being dirty every moment of every day. Thus, a better-developed system can solve it and that is what our project aims to do. We propose a project based on geoinformatics information system to map and manipulate the issues related to waste disposal thereby making a cleaner and a better India.

## **2. RELATED WORK**

Similar works have been done but in different places or perspectives, till date. Dr. Indrajit Roy Chowdhury in his paper[1] "Traffic Congestion and Environmental Quality: A Case Study of Kolkata City" in International Journal of Humanities and Social Science Invention Volume 4 Issue 7, clearly states that due to traffic jam a substantial portion of working hours have to be left on street which directly put adverse impact on economy. Congestion causes tremendous vehicular air pollution within the city of Kolkata.

Regarding Waste disposal and management systems also S. Ray et. al. has researched and stated that no source segregation arrangement exists; there is only limited (60%) house-to-house collection; and 50-55% open vats are used in the present collection system. The operational efficiency of the Kolkata Municipal Corporation (KMC) transport system is about 50%, with a fleet composed of about 30-35% old vehicles. The majority (80%) of these, particularly the hired vehicles, are more than 20 years old. The newly added areas covered by KMC have even lower collection efficiencies, and only an informal recycling system exists. The waste collected has a low energy value (3,350-4,200kJkg(-1)) with high moisture and inert content. A 700td (-1) compost plant set up in 2000 has not been functioning effectively since 2003. Open dumping (without liners and without a leachate management facility) and the threat of groundwater pollution, as well as saturation of an existing landfill site (Dhapa) are the most pressing problems for the city today. KMC spends 70-75% of its total expenditures on collection of solid waste, 25-30% on transportation, and less than 5% on final disposal arrangements. The Kolkata Environmental Improvement Project, funded by the Asian Development Bank, is seen as only a partial solution to the problem.

Proper waste management is a fundamental key to environmental sustainability[3]. In this study, the municipal solid waste management and disposal methods in Abakaliki Metropolis, Ebonyi State, Nigeria is presented. The characteristics and composition of these wastes and the environmental issues associated with its management are also investigated. Structured questionnaires were used to obtain primary data from a random size of population in the areas that have the highest accumulation of heaps of solid wastes in the Government designated waste dumping sites and open spaces on the major streets within the metropolis. Environmental and health issues arising from the unsustainable management of the wastes were

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assessed from oral interviews and field observations in the study areas. The results indicates that the waste dump sites (designated and non-designated) on the major streets and several open spaces are left unattended for long periods such that the rubbish heaps; encroach on the roads thereby limiting the road users access, generate serious air pollution issues, constitute significant nuisance when blown over by winds, and distorts the aesthetic view of the metropolis. The results also show that the composition of the wastes in the metropolis is heterogeneous because it contains both biodegradable and nonbiodegradable materials.

With a growing number of mobile applications available on application stores and the improved capabilities of smartphones, people download more applications to their devices. Researchers began to leverage this momentum for distributing applications to conduct studies on end-users' devices. This paper[4] grounds the approach of research through the applications store in the theory of quasi-experimental design. Further, with people having more applications installed, finding applications quickly when they need them can become a time-consuming issue that impacts user experience. This paper presents our approach to improve future design of smartphone launcher menus. The authors present our approach of combining research through the app store with the idea of studying people's smartphones as the apparatus themselves. Therefore the authors designed a game that takes advantage of the user's smartphone itself as a field of play. By timing a simple visual search task for an icon, the authors aim to deduce how well a user knows where he can find his applications, and thus how well he can build a mental model of his smartphone launcher menu. The authors introduce our approach, present the game rapidly that serves as a vehicle of our research question, and discuss open challenges and future work.

Bigdata is a hot and mysterious term according to the paper by Tsou[5]. They have showed how big data techniques could involve the use Geoinformatics Information system in various ways.

Jeroen Beliën's paper[6] presents a review of the available literature on solid waste management problems, with a particular focus on vehicle routing problems. The available papers are classified into different categories with the purpose of providing the reader with a guide that facilitates his/her search for papers in his/her field of interest. For each category, a table is presented that gives a summary of how each paper scores from that perspective. Additional explanation is presented about the characteristics of each category using some key references. Finally, this paper discovers unexplored areas of research and identifies trends in the literature.

One of the challenge to build smartcities is the smart parking. several solutions[7] have been proposed: different types of sensors (magnetometers, light sensors, microphones, etc.), different communication technology (wired, wireless), and different types of cameras. smart parking is a system capable of extracting specific information from the captured images and different sensors. solutions based on computer vision and big data are deployable on top of visual sensor networks. the iot paradigm fits particularly well in urban scenarios as a key technology for the smart city concept. the paper presents an efficient solution for real-time parking lot occupancy detection based on convolutional neural network classifier, real time image segmentation and analysis, and streaming data.

# **3. PROPOSED WORK**

#### 3.1 Objective and purpose of proposal -

The objective is to get a cleaner and developed Kolkata by solving the main problems by measuring area and slope and contours and clipping as raster form via maps made using geoinformatics system implementing map digitization and 3D modelling. It lets people reach out to the government easily. Also issues of proper place and method of garbage collections and disposal can be well monitored. All the current update and details will be updated in real time and will be available to the people. Workers will be assigned by the government only for this purpose. All the workers and job assignment and management should be shifted in online. All the workers will be getting notification about the assigned task. Workers will get the job location by the application. There will be a well-designed navigation system for the job location is worker don't know the place.

#### 3.2 Working Principle -

One android application is developed to perform the task. Every android device has several system service including location service. The application uses the Global Positioning System (GPS) receiver for computing the latitude and longitude of that place and upload it on a real time database. But before updating it checks the database that the location is already updated or not. If the location is already present into database it simply ignore the request and acknowledge the application user that the data is already submitted by someone else.



All the updated data set will be available online for everyone to check current state of the city. At another end a web page is developed for administrative activity is provided to the local municipality to monitoring and task assignment for worker (garbage collector).



The admin has that privilege to assign job to all worker (Garbage collector). All worker will getting notification on their application as per the job is assigned. Garbage location and all the information related to the job is required will be provided via application.



Worker Android Device

Figure 3.

Job noification for Workers

# 3.3 Proposed algorithm –

- Android Application:
  - 1. Fetch Latitude, Longitude Accuracy.
  - 2. Upload it into database.
- Web Service for Android Application:
  - 1. Get Latitude, Longitude and Accuracy from Post request.
  - 2. Search by Latitude and Longitude.
  - 3. If the value already present into database then ignore.
  - 4. If the value is not present into database then save it.



## 4. EXPERIMENT AND RESULT

In this section we have shown that the system is working. The android application is installed in an android phone and a PC (Personal Computer) is used for Administrative work.

Here the application uploading the location where garbage is dropped.

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34.4						
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Figure 4 - Location Uploading

After uploading the location all the details is available on the Admin page of that web.



Figure 5 - Admin Monitoring System

Job assignment among worker (Garbage collector).

Admin Con	sole Dash	board			
Job Ass	ign				
Issue ID:	3	()	Employee:	ss.jisce@gmail.com	Assign

Figure 6 - Job Assignment to the worker by municipality

All the worker gets update about the job in that application.



Figure 7 - Job update i.e. location point

#### **5. CONCLUSION**

The advancements and reach of Geoinformatics Information System is widely being implemented all over the world. The usefulness and importance in the application of Geographical Information System (GIS) is well understood in India and is being further developed for use by a larger community sector. With the rapid stride, India has made during the last two decades by launching its own land resources satellites, like Indian Remote Sensing Satellite (IRS) – 1A, 1B, 1C and 1D, data from these have been well receiving by the international community and perhaps used extensively all over the world. Thus, we too with our small step have tried to implement geoinformatics system to help life get simpler and help in digitizing India. The app we made let us people reach out to the government easily. Government keeps track of the works done to solve people's problems. Issues of proper place and method of garbage collections and disposal are well monitored. Thus with this application that serves as an interface and is useful to both the general people and government, life in India will be easier and better as we had aimed for.

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