

SMART WASTE MANAGEMENT SYSTEM

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INTRODUCTION:

The waste collection process is a critical aspect for the service providers. The traditional way of manually monitoring the wastes in waste bins is a complex, cumbersome process and utilizes more human effort, time and cost which is not compatible with the present day technologies. Irregular management of waste typically domestic waste, industrial waste and environmental waste is a root cause for many of the human problems such as pollution, diseases and has adverse effects on the hygiene of living beings. In order to overcome all these problems, we are proposing the idea of smart waste management system which helps in auto-management of waste without human interaction in order to maintain a clean environment.

The concept of smart waste management is implementable in cities where waste production is domestically high but the effort put to control it is relatively very low. This idea is compatible mainly with the concept of smart cities. The smart waste management mainly avoids the congested collection of waste generated domestically which creates difficulty to manage its disposal.

All cities, regardless their size, their geographical location or their economic level, spend huge amount of money every year for waste collection. The number of bins located in the streets and the number of vehicles used to empty them are generally estimated based on the number of citizens, but the resulting estimation is sometimes either too high or too low.

OBJECTIVES:

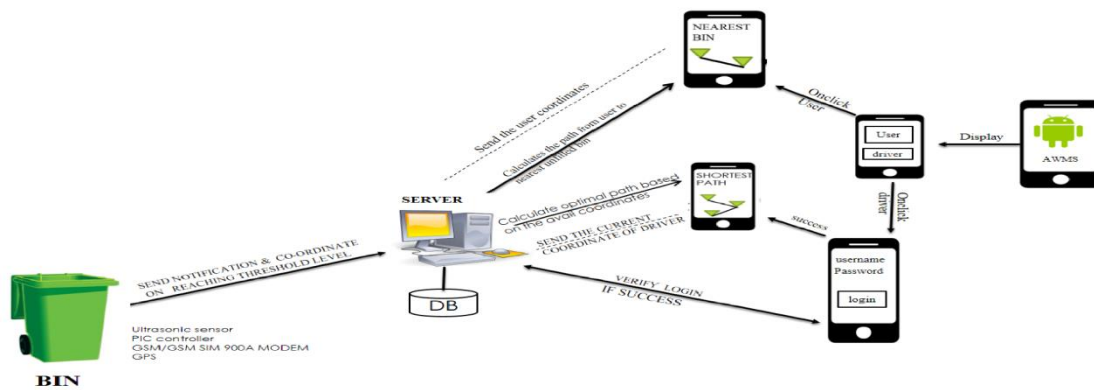
Smart waste management is a idea where we can control lots of problems which disturbs the society in pollution and diseases. The waste management has to be done instantly else it leads to irregular management which will have adverse effect on nature. The Smart waste management is compatible mainly with concept of smart cities.

The main objectives of our proposed system are as follows:

1. Monitoring the waste management.
2. Providing a smart technology for waste system.
3. Avoiding human intervention.
4. Reducing human time and effort
5. Resulting in healthy and waste ridden environment.

This project falls under the category of embedded systems and android applications.

METHODOLOGY:

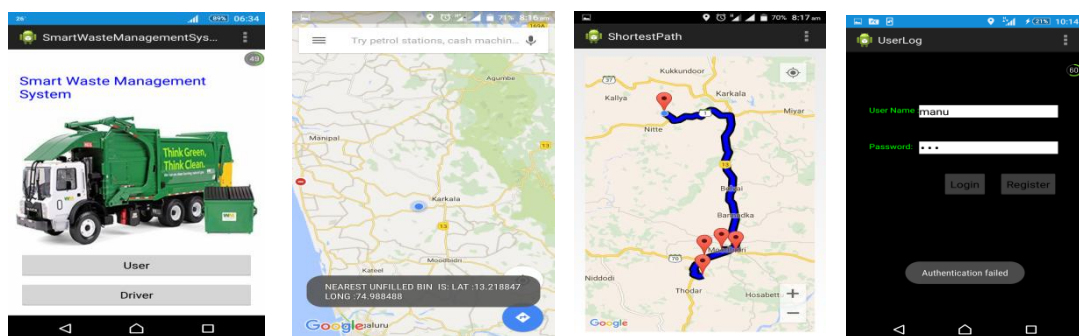


The bin with ultrasonic sensor, PIC controller, GSM and GPS will notify the coordinate and bin status to the database. Here GSM is used to communicate with the server, which will contain the SIM with the basic speed internet. The ultrasonic sensor which uses ultrasonic waves will check the bin status. The PIC controller board is used to control ultrasonic sensor, GSM and GPS.

The server will maintain the details of the unfilled bins, filled bins and authority registration. Whenever the normal user or authorised bin collect or request from the database the information will be given to them. The information to the normal user is about the nearest unfilled bin and authorised person will be given the coordinates of the filled bins.

The user end will contain the android app which works on android compatible phone. There will be two separate buttons for user and authority. The user will notify the unfilled nearest bin with path and authorised person will be notified by the filled bins with path. The working is as follows, User inserts trash into the bin, Bin checks for threshold level, Bin sends the status and coordinates to the Control centre on reaching the appropriate level, Control centre uses the coordinates sent by multiple Bins and provides an optimal path to the garbage vehicle, The bin if emptied by the vehicle, a notification is sent by it to Control centre. This helps in easy monitoring.

RESULTS:



The first page of the android application is displayed with a user interface. It consists of two buttons, one named User identifies the user portal which can be used by the common citizens who dump waste in their daily routine and the Driver portal that identifies the button for the drivers who are allocated for collection of waste for their respective areas.

The second diagram indicates the outcome for the normal user who has the option of getting the location of the nearest bin available from his current location.

The third diagram is the outcome or the result for the driver, where the pin points indicates the filled bins and the blue line indicates the path that links those in a linear fashion. The driver has to traverse through every pinned location in order to empty the filled bins. The path begins from the blue dot that indicates the current location of the driver.

CONCLUSION:

Monitoring the fullness of bins through the use of sensors, it is possible to achieve a more efficient system than the current existing. Our idea of “Smart waste management system”, mainly concentrates on Monitoring the waste management, providing a smart technology for waste system, avoiding human intervention, reducing human time and effort and which results in healthy and waste ridden environment.

The proposed idea can be implemented for smart cities where the residents would be busy enough with their hectic schedule and wouldn't have enough time for managing waste. The bins can be implemented in a city if desired where there would be a large bin that can have the capacity to accumulate the waste of solid type for a single apartment. The cost could be distributed among the residents leading to cheaper service provision.

FUTURE ENHANCEMENTS:

There are several future works and improvements for the proposed system,

1. Change the system of user's authentication and atomic lock of bins which would help in securing the bin from any kind of damage or theft.
2. Concept of green-points that would encourage the involvement of the residents or the end users making the idea successful and helping to achieve joined efforts for the waste management and hence fulfilling the idea of Swachh Bharath.
3. Having a case study or data analytics on the type and times the waste is collected on the type of days or season making the bin filling predictable and removing the dependency on electronic components and fixing the coordinates.
4. Improving graphical interfaces for the Server and complete Android applications has possibility of extending the system adding other use cases and applications for smart cities.
5. Moreover, the proposed solution is flexible and decoupled with respect to the determination of optimal number of bins and vehicles or to the algorithm that define the best route for vehicles.

Therefore, future works can be made in the study of models that offer the best results in terms of decision-making.