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INTEGRATION OF LOCATION-BASED GARBAGE COLLECTION

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Abstract: Multiple mobile or web applications are combined in smart cities to create comfortable human habitation. Making an efficient, effective, and ecologically friendly rubbish management system is one of these alternatives. The current trash collection system involves daily or weekly rounds of routine garbage trucks, which not only don't cover every part of town, but may also be a wholly inefficient use of public funds. This idea offers a low-cost mobile or web-based system that the government may use to effectively handle the enormous volumes of trash that are collected every day, as well as a much better answer to the nuisance of electric pigs for the people. Additionally, all users of this app can access the Google map to view the whereabouts of the garbage collector. This is accomplished by a network of smart bins that employ cloud-based monitoring and analysis tools to provide garbage trucks with predicative routes. For the workforce and therefore the citizens, an internet app is created that principally offers the generated routes for the labour and locates the closest available smart bin for citizens.

Keywords: Rubbish management, Smart bin, Garbage trucks, Generated routes, Smart city.

1. Introduction

Based on the data collected, garbage trucks can be given routes generated through Google maps API to efficiently route through all necessary garbage bins and finally reach the dumping site. In the city of metropolitan urban communities, many individuals are passing a similar area around one moment. Around of individuals are conveying food covers, polythene packs, and plastic jugs. In the event that they arrange all them without a moment's delay, the containers will be filled in a few minutes. At the point when they top off individuals simply litter their rubbish around the trash containers on the grounds that there is no place else to put them.

The obvious solution to this is for the cleaning crew to continually stay close to trash canisters until they are full so they can clean them. This arrangement is definitely not real. It requires a lot more cleaning employees than usual and is very expensive. It makes no sense in this way. Workstations are experiencing a similar scenario.

When this is done for a considerable amount of time, it initially starts to smell bad. In this way, later visitors are less likely to approach and throw their trash towards the trash cans. Throwing it causes any further food items to spill if there are any. Additionally, these species spill them much more. The spread of infections has an adverse effect as well. They were dispersed by rubbish, although wildlife can also serve as a source.

2. Literature Survey

[1] "IoT Based Waste Management for Smart City" is an article by Prabu Parkash published in February 2019.

The article explores the application of Internet of Things (IoT) technology in waste management within the context of a smart city. It likely discusses how IoT devices, sensors, and data analytics can be utilized to optimize waste collection, monitoring, and disposal processes. The article may provide insights into the benefits, challenges, and potential solutions related to implementing IoT-based waste management systems in smart cities.

[2] Rushikesh Wanjare , Harshad Pawar , Sarthak Kadu , Pratik Nikam , Prof. Pradnya Narkhede is an article “Location based garbage management system” published in 2022.

The proposed solution for rubbish management in smart cities involves a mobile or web-based system that utilizes smart bins and cloud-based tools. The system optimizes garbage collection routes through predictive algorithms and provides an internet app for garbage truck workers and citizens. By leveraging real-time data and analysis, the system offers an efficient, cost-effective, and environmentally friendly alternative to traditional trash collection methods. It improves resource utilization, reduces costs, and enhances overall rubbish management in smart cities.

[3] " Smart Garbage Tracking System" is an article by P.Bhavani , R.Yogasri , S.Santhanalakshmi , and S.Meharajebeham published in April 2021.
A smart waste tracking system using IoT, Android, GPS, and Google API is implemented to address garbage collection inefficiencies and promote cleanliness. IoT-enabled bins with fill level sensors transmit real-time data to a central server. A GPS-equipped garbage collection truck, guided by an Android app, optimizes routes based on bin fill levels displayed on a Google map. Real-time alerts ensure timely waste collection, reducing overflowing bins and the spread of diseases. The system supports the SWACHH BHARAT goal by improving waste management and promoting a clean environment.
[4] "Location Based Garbage Management System For Smart City" is an article by P.K.S.Harini, S.Ramya, R.Yamini published in November 2020.
A mobile and web-based system is proposed to improve waste management in smart cities, offering an efficient and eco-friendly solution. By integrating intelligent bins and cloud-based tools for data analysis, garbage collection routes can be optimized. A mobile or web application guides employees and directs citizens to the nearest accessible trash bins. This system improves efficiency, extends coverage, enhances convenience for citizens, and reduces costs while promoting a cleaner and more comfortable living environment.

3. Proposed work

The idea of INTEGRATION OF LOCATION-BASED GARBAGE COLLECTION is implementable in cities where home trash generation is substantial but there is relatively little effort put into controlling it. The idea of smart cities is primarily compatible with this one. This largely prevents the clogged collection of home garbage that makes it difficult to handle its disposal. The suggested solution can be put into practise in smart cities where residents would dispose of their trash using garbage collecting vehicles. People post a statement that the public can track their vehicles when they want to dispose of their trash. The expense could be split among the locals, resulting in less expensive service delivery.

4. Modules Description

"INTEGRATION OF LOCATION-BASED GARBAGE COLLECTION" is the name of the project, and it uses Android as the front end and SQ-LITE as the back end.
Admin Bin list,
Driver details,
Send Location

4.1 Admin Bin List

To access the bin list with collected information, as well as the driver information with ID, name, and vehicle number, an admin login is typically required. The admin login provides authorized access to the system or platform where the data is stored. Once logged in, the admin can perform the following steps:

1. Navigate to the appropriate section or module that contains the bin list and driver information. This could be a dashboard, database management system, or a dedicated admin interface.
2. Locate the bin list section, which should display the collected information related to bins. This might include details such as bin ID, location, capacity, status, and other relevant data.
3. Similarly, find the driver information section, which should display the details of drivers, including their ID, name, and vehicle number. Depending on the system, there might be additional fields such as contact information, license details, or employment history.
4. Use the provided tools or filters to search, sort, or refine the displayed data as needed. This allows the admin to locate specific bins or drivers based on various criteria.
5. Review the information presented in the bin list and driver information sections. Admins can analyze the data, generate reports, or perform any necessary actions based on the collected information.

4.2 Driver Details

Driver information includes the driver's name, vehicle number, and driver ID.

a) Driver ID: A unique identifier assigned to each driver. It helps in distinguishing one driver from another in the database.
b) Name: The driver's full name, which includes their first name and last name. It helps in identifying the driver by their personal information.
c) Vehicle Number: The number assigned to the vehicle that the driver operates. It is used to link the driver to a specific vehicle in cases where multiple vehicles are associated with a company or organization.

These details are commonly stored in databases or records systems to keep track of driver information and facilitate various operations such as driver management, vehicle assignments, and reporting.

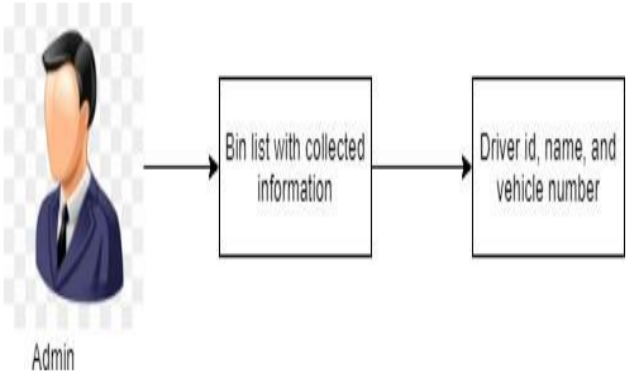

Fig.1*Driver details Module*

4.3 Send location

In this module, the administrator can tell the driver or garbage collector where to go pick up trash.

a) Access the admin interface or dashboard: Log in to the admin account and navigate to the appropriate section or module that handles task assignment.
b) Identify available drivers or garbage collectors: Retrieve a list of drivers or garbage collectors who are available for task assignment. This list may include their names, IDs, and other relevant information.
c) Select a driver: Choose the appropriate driver or garbage collector for the task based on factors such as their availability, location, or assigned area.
d) Specify the pickup location: Provide the specific location where the trash needs to be picked up. This could include the street address, neighborhood, or any other relevant details.
e) Set the task details: Define the details of the task, such as the date and time for the pickup, any special instructions, or additional notes if necessary.
f) Assign the task: Assign the task to the selected driver or garbage collector by linking the task details with their ID or name in the system.
g) Notify the driver: Send a notification or alert to the driver, informing them about the assigned task. This notification can be in the form of an email, SMS, or through a dedicated communication channel within the system.
h) Monitor and track the task: Keep track of the assigned task's status and progress through the admin interface. This allows the administrator to ensure that the task is completed within the specified timeframe.

The following process is accessible after user login and registration:

1. Bin list with action
2. The location of the waste collection

ACTIONABLE BIN LIST

The user's actions, such as completing the request for garbage collection and deleting the request, are recorded in the bin list.

THE PLACE NEAR THE GARBAGE TO COLLECT

The user can view the location of the vehicle that will be used to collect trash in this module.

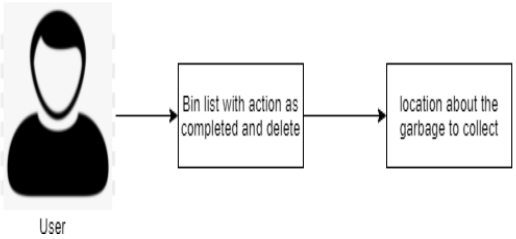

Fig.2 *bin list with action*

5. Software Project Plan

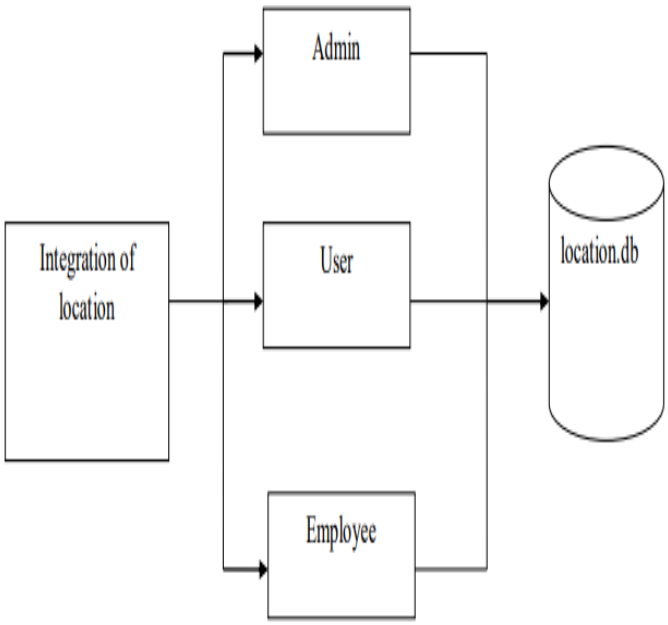

Fig.3 *software project plan*

6. Data Flow Diagram

6.1 Admin

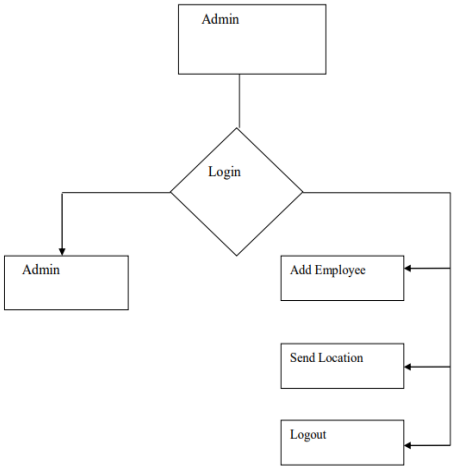

Fig.4 *Admin*

6.2 User

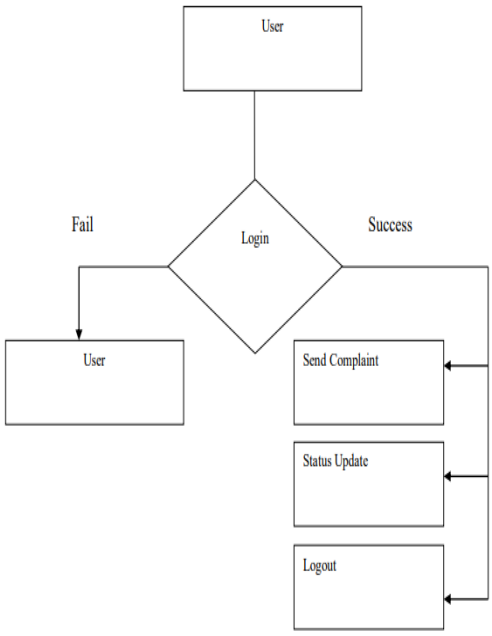

Fig.5 *User*

6.3 Employee

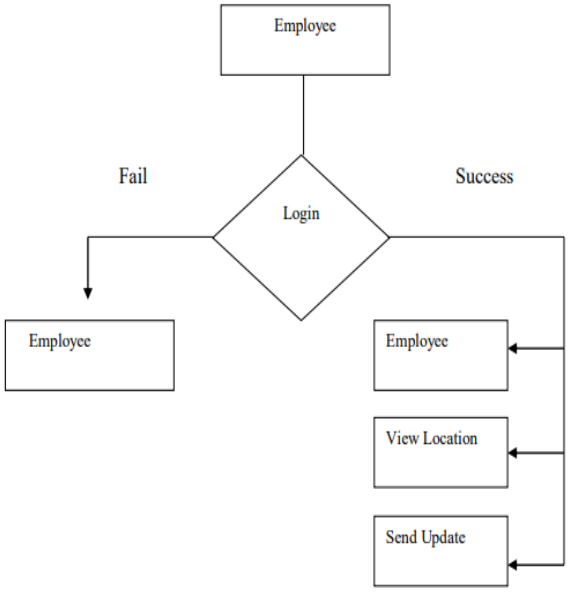

Fig.6 *Employee (Driver)*

7. System Requirements

Software Requirements

Android : Emulator

Android : SDK – adt-bundle-windows-x86

IDE : Eclipse Mars

Front End : Android

Back End : Sqlite

Hardware Requirements

Processor : Intel i5

Installed memory (RAM) : 8 GB

Hard Disk : 1TB

Operating System : windows 10

8. Future Work

In future work, two potential areas of improvement for waste management systems include automated garbage sorting and decentralized communication between bins. The goal is to create a more efficient and cost-effective system. One idea is to develop a specialized bin that can automatically sort different types of garbage, reducing the need for human segregation. Instead of multiple bins, a single large bin with self-segmentation capabilities could be used. Additionally, instead of each bin connecting individually to a server, the bins could communicate with each other and connect to a central access point through a main hub. These ideas require further research and consideration to determine their feasibility and practicality.

9. Conclusion

The system that was created offers a better database for garbage pickup times and, as a result, the amount of garbage picked up at each location. By putting this proposal into action, we'll prevent the overflowing of the rubbish container in residential areas, which was previously either manually loaded or helped by loaders inside the conventional trucks. The project can be implemented with the existing hardware and software. The project is excellent for saving time and modifying the typical waste disposal method. Maintain the cleanliness of the earth and provide the populace with a waste-free environment.

10. References

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