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SMART GARBAGE MANAGEMENT SYSTEM

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ABSTRACT

The smart garbage management is a mobile application designed to revolutionize waste management practices by leveraging modern technology. With the proliferation of smart phones, there exists an opportunity to optimize waste collection processes and enhance efficiency in urban environments. This application offers a user-friendly interface for both citizens and waste management authorities to streamline the waste collection process. Through smart bin technology, users can able to post the bin status like filled. Admin can monitor the status of the bin by the user status update. Once the user updates the bin status then the admin allots a driver for that particular bin. The driver once completed the work will update the status as completed. The Smart Garbage Management Application aims to promote efficient waste management practices, reduce environmental impact, and enhance the overall quality of life in urban areas.

INTRODUCTION

The introduction to the Smart Garbage Management Application heralds a new era in waste management, harnessing the power of modern technology to address longstanding challenges in urban environments. With the ubiquity of smart phones, this application presents an innovative solution to optimize waste collection processes and bolster efficiency. Its user-friendly interface serves as a bridge between citizens and waste management authorities, facilitating seamless communication and coordination. Through the integration of smart bin technology, users can conveniently report the status of bins, enabling administrators to promptly allocate resources and optimize collection routes. By leveraging real-time data and automated workflows, the application streamlines operations, ensuring timely and efficient waste disposal. Ultimately, the Smart Garbage Management Application aims to not only enhance operational efficiency but also contribute to environmental sustainability and improve the overall quality of life in urban areas.

REVIEW OF LITERATURE

Hamid Umer(2022)[1] Managing waste is a challenging issue for both wealthy and developing nations. One of the main issues is that public trash cans frequently overflow far in advance of the next cleaning schedule. High concentrations of gasses, insects, and houseflies are brought on by waste management and can have detrimental effects on one's health. This paper offers a thorough analysis of the literature on machine learning-based smart waste management. The system might improve garbage disposal by taking the fastest path with machine learning. The waste weight is determined by equipment integrated into the ML-IoT-based architecture, which adapts to the network environment and holds waste management data. The purpose of comparing the research is to provide the reader with a comprehensive understanding of the smart waste management field.

S. Varudandi (2021)[2] An increasing amount of waste is produced directly or indirectly in this context of global development at a rapid pace. An efficient management strategy is needed for the tons of rubbish that are generated every day. If it is not done correctly, there will be a need for practically infinite open regions where the waste can be dumped. These waste management issues will be helped by the system this study suggests. This system's primary component is a waste bin that uses technologies like machine learning and the internet of things to automatically separate rubbish. The bin is linked to the cloud, which tracks and uploads different data points for a specific bin to help with systematic waste collection.

Reeny Zackarias(2018)[3] The amount of solid trash generated by municipalities is rising dramatically due to factors such as urbanization, migration, changing lifestyles, and population growth. Not only do underdeveloped countries confront difficulties with waste management, but developed and advanced ones also do. The people' quality of life is greatly impacted by effective garbage management. The rationale is that improper garbage disposal is directly linked to detrimental effects on the environment and, consequently, the health of the populace. Additionally, the amount of rubbish beside to the roadways contributed to the unsanitary conditions and foul odor. It has a detrimental effect on tourism as well. Better waste management is also provided by the intelligent waste management system, which assists in removing waste at the proper time to prevent overflow.

SYSTEM REQUIREMENTS

System requirements are the parameters and standards that specify the hardware, software, performance, and additional elements required for a computer system or software program to operate as intended. These defined criteria serve as a roadmap for the system's creation, deployment, and use, guaranteeing that it achieves its goals and runs well. The configuration that a system needs in order for hardware or software to function properly and efficiently is known as system requirements.

If any of these prerequisites are not met, installation or performance issues may arise. It's specs that list the minimal and suggested configurations of hardware, software, and peripherals required for a computer system to function properly when running a given software program, operating system, or piece of hardware.

These specifications operate as recommendations to guarantee compatibility and best possible performance for manufacturers, developers, and users.

System requirements are crucial for developers and end users to understand the necessary infrastructure and conditions for smoother performance. Common components of system requirements include:

- Software Requirements
- Hardware Requirements.

System requirements are essential specifications that outline the necessary configurations and capabilities for running specific software applications on a computer system. These requirements ensure optimal performance, compatibility, and a smooth user experience.

HARDWARE REQUIREMENTS

These requirements include the minimum processor speed, memory and disk space required to install windows. In almost all cases, you will want to make sure that your hardware exceeds these requirements to provide adequate performance for the services and applications running on the server.

Hardware requirements:

Processor	I3
Hard Disk Drive	500GB
Mouse	Logitech
Keyboard	Logitech 108 keys
Monitor	Samsung

SOFTWARE REQUIREMENTS

Software requirements are the specifications of what a software system should do, how it should behave, and what constraints it should satisfy. They are essential for communicating the expectations and needs of the stakeholders, as well as for guiding the design, development, testing, and maintenance of the software.

software requirements:

Operating System	Windows 10
Front End	Android / Visual Studio .Net 2008
Back End	Microsoft SQL Server 2005
Language	JAVA & C#.Net
Server	IIS

SYSTEM DESIGN

Systems design is the design of systems. It suggests a methodical and exacting approach to design, one that the scope and complexity of many systems challenges require. The system's architecture initially

surfaced just before World War II, when engineers were trying to solve difficult control and communications issues.

Their research was formalized in the emerging fields of cybernetics, operations research, and information theory. This knowledge was brought to the design community in the 1960s by individuals involved in the design methods movement, namely Horst Rittel and others at Ulm and Berkeley. In the field of computer science and at institutions that are engaged in design planning, systems design is still thriving. The study of systems for making and recording design decisions, or "design rationale," is one of its most significant legacies.

FILE DESIGN

A file system provides the machinery to support the project tasks. At the highest level a file system is a way to organize, store, retrieve, and manage information on a permanent storage medium such as a disk. File systems manage permanent storage and form an integral part of all operating systems. There are many different approaches to the task of managing permanent storage. At one end of the spectrum are simple file systems that impose enough restrictions to inconvenience users and make using the file system difficult. In deciding what type of filing system is appropriate for a particular operating system, we must weigh the needs of the problem with the other constraints of the project. The two basic abstractions of files and directories form the basis of what a file system can operate on. There are many operations that a file system can perform on files and directories. All file systems must provide some basic level of support. Beyond the most basic file system primitives lay other features, extensions, and more sophisticated operations.

The Structure of a File is given the concept of a file, a file system may impose no structure on the file, or it may enforce a considerable amount of structure on the contents of the file. An unstructured, “raw” file, often referred to as a “stream of bytes,” literally has no structure. The file system simply records the size of the file and allows programs to read the bytes in any order or fashion that they desire. If a file system chooses to enforce a formal structure on files, it usually does so in the form of records. With the concept of records, a programmer specifies the size and format of the record, and then all I/O to that file must happen on record boundaries and be a multiple of the record length.

EXISTING SYSTEM

Prior to the development of the Smart Garbage Management Application, waste management systems in urban areas typically relied on traditional methods, which often proved to be inefficient and outdated. These methods included manual collection processes, where waste collection teams followed predetermined routes regardless of the actual fill levels of garbage bins. Additionally, there was a lack of real-time monitoring and communication between citizens and waste management authorities, leading to delays in addressing overflowing bins or other issues. Administrative tasks such as bin allocation and driver assignment were often handled through manual paperwork or basic digital systems, lacking the sophistication needed for optimal resource allocation and efficiency. Overall, the existing waste management system suffered from inefficiencies, lack of transparency, and limited responsiveness to the

dynamic needs of urban environments. Recognizing these shortcomings, the Smart Garbage Management Application was developed to introduce a more advanced and integrated solution that leverages modern technology to enhance efficiency, transparency, and sustainability in waste management practices.

DRAWBACKS

- Lack of real-time monitoring
- Limited Communication
- No existing application exists for the mobile platform
- Unnecessary collection trips to bins that may not be full**.**

PROPOSED SYSTEM

The proposed Smart Garbage Management Application introduces a transformative solution to overcome the limitations of the existing waste management system. This innovative system leverages mobile applications and smart bin technology, to revolutionize waste collection processes in urban environments. Waste management authorities gain instant visibility into bin fill levels, allowing for timely interventions to address overflowing bins and other issues. A user-friendly interface accessible via smart phones empowers citizens to effortlessly report bin statuses, facilitating efficient communication and coordination between users and administrators. Automated workflows streamline administrative tasks such as bin allocation and driver assignment, optimizing resource allocation and collection routes. By enhancing efficiency, transparency, and responsiveness, the proposed Smart Garbage Management Application promises to significantly improve waste management practices, reduce environmental impact, and elevate the quality of life in urban areas.

ADVANTAGES

- Better Communication
- Reduce unnecessary trip
- More efficient
- Environmental sustainability

METHODOLOGY

A methodology for a smart garbage management system, which aims to monitor and track the movement of waste to optimize collection and recycling efforts, could involve the following steps:

Problem Identification: Understand the challenges and inefficiencies in current waste management practices, such as improper disposal, inefficient collection routes, or lack of recycling initiatives.

Goal Definition: Clearly define the goals of the trash tracker system, such as reducing landfill waste, increasing recycling rates, minimizing littering, or optimizing collection routes.

Technology Selection: Choose appropriate tracking technologies, such as GPS trackers, RFID tags, or barcode labels, depending on the requirements and constraints of the system.

Waste Characterization: Analyze the types and quantities of waste generated in different areas to tailor the trash tracker system to specific needs and optimize waste management strategies.

Deployment Planning: Develop a deployment plan for installing tracking devices on waste containers, vehicles, or individual items, considering factors such as coverage area, population density, and infrastructure limitations.

Data Collection: Collect data from tracking devices in real-time or at regular intervals to monitor the movement and status of waste throughout the disposal and collection process.

Data Processing and Analysis: Process the collected data to generate insights into waste generation patterns, collection efficiency, recycling rates, and potential areas for improvement.

Route Optimization: Utilize the collected data to optimize waste collection routes, schedules, and resource allocation, reducing fuel consumption, vehicle emissions, and operational costs.

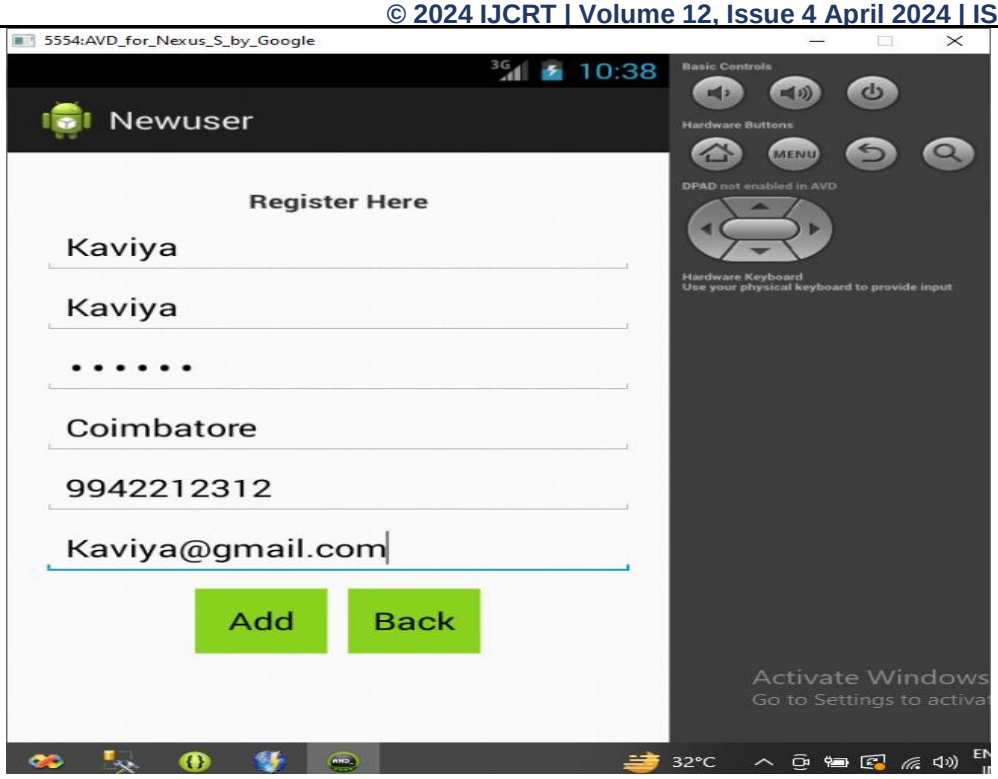
Feedback Mechanism: Implement a feedback mechanism to allow stakeholders, such as waste collectors, recycling facilities, and residents, to provide input and report issues related to waste management.

RESULT

User Table

Primary key: userid

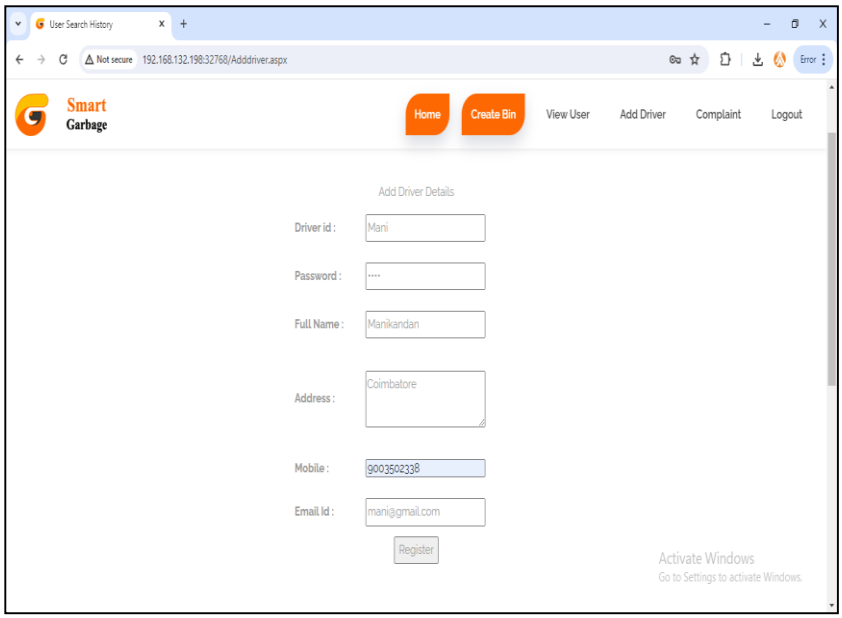
Column Name	Data Type
userid	varchar(50)
fullname	varchar(50)
pwd	varchar(50)
address	varchar(5000)
mobile	varchar(50)
email	varchar(50)



Driver Table

Primary key: userid

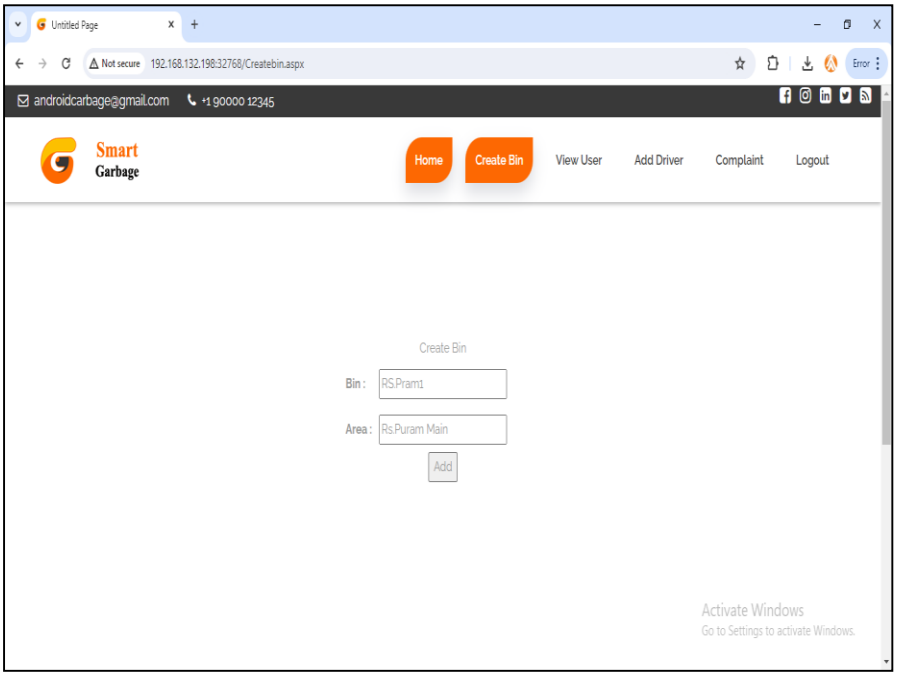
Column Name	Data Type
Userid	varchar(50)
pwd	varchar(50)
Fname	varchar(50)
Addr	varchar(50)
mobile	varchar(50)
email	varchar(50)



Bin Table

Primary key:id

Column Name	Data Type
id	int
Bin	varchar(50)
Area	varchar(50)

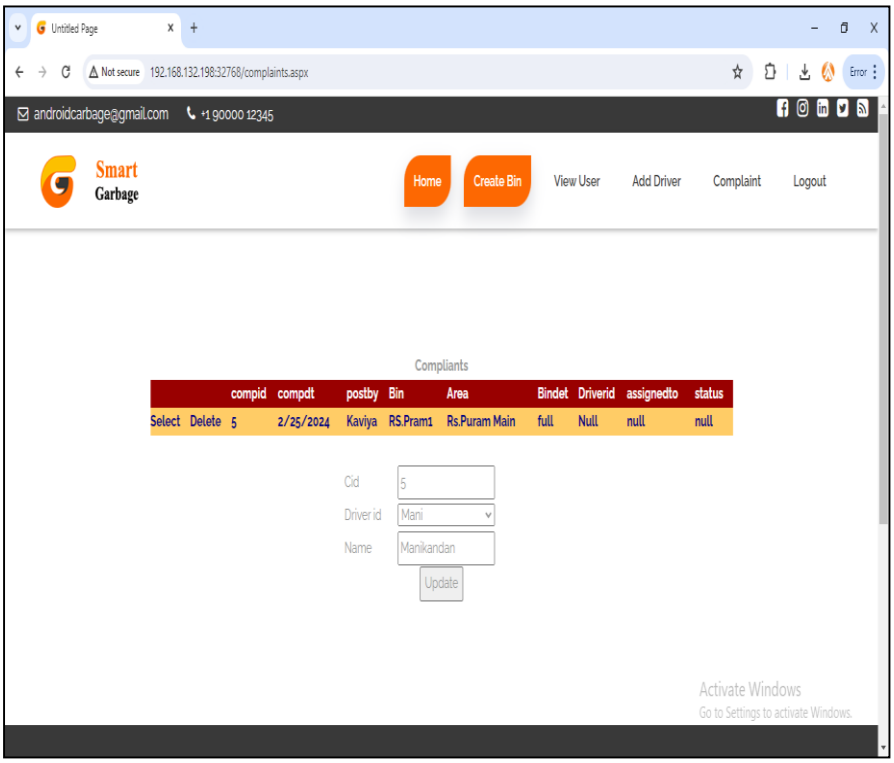


Complaint table

Primary key: comid

Foreign key: driverid

Column Name	Data Type
compid	int
compdt	varchar(50)
postby	varchar(50)
Bin	varchar(50)
Area	varchar(50)
Bindet	varchar(50)
Driverid	varchar(50)
assignedto	varchar(50)
status	varchar(50)



IMPLEMENTATION

Implementation is the most crucial stage in achieving a successful system and giving the user's confidence that the new system is effective and workable. Implementation of this project refers to the installation of the package in its real environment to the full satisfaction of the users and operations of the system. Testing is done individually at the time of development using the data and verification is done the way specified in the program specification. In short, implementation constitutes all activities that are

required to put an already tested and completed package into operation. The success of any information system lies in its successful implementation.

System Implementation is the stage in the project where the theoretical design is turned into a working system. The most critical stage is achieving a successful system and in giving confidence on the new system for the user that it will work efficiently and effectively. The existing system was long time process. The project execution was checked with live environment and the user requirements are satisfied. Proper implementation is essential to provide a reliable system to meet the organization requirements.

CONCLUSION

It is concluded that the application works well and satisfy the end users. The application is tested very well and errors are properly debugged. The application is simultaneously accessed from more than one system. Simultaneous login from more than one place is tested.

This system is user friendly so everyone can use easily. Proper documentation is provided. The end user can easily understand how the whole system is implemented by going through the documentation. The system is tested, implemented and the performance is found to be satisfactory. All necessary output is generated. Thus, the project is completed successfully. Further enhancements can be made to the application, so that the application functions very attractive and useful manner than the present one. The speed of the transactions become more enough now.

SCOPE FOR FUTURE ENHANCEMENT

The future enhancements for the smart garbage management system could encompass a multifaceted approach aimed at enhancing user experience, community engagement, and data analysis. These include integrating advanced data visualization tools to provide users with more insightful and interactive representations of trash data, fostering community engagement through collaborative features for organizing clean-up efforts and sharing information about trash hotspots. Additionally, implementing machine learning algorithms could enable the prediction of future trends in trash accumulation, while developing a mobile app version would increase accessibility and real-time reporting capabilities.

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