SMART WASTE MANGEMENT

SYSTEM FOR METROPOLITAN

CITIES USING IOT

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PROPOSED SOLUTION

Global industry is undergoing major transformations with the genesis of a new paradigm known as the Internet of Things (IoT) with its underlying technologies. Many company leaders are investing more effort and money in transforming their services to capitalize on the benefits provided by the IoT. Thereby, the decision makers in public waste management do not want to be outdone, and it is challenging to provide an efficient and real-time waste management system. This paper proposes a solution (hardware, software, and communications) that aims to optimize waste management and include a citizen in the process. The system follows an IoT-based approach where the discarded waste from the smart bin is continuously monitored by sensors that inform the filling level of each compartment, in real-time. These data are stored and processed in an IoT middleware providing information for collection with optimized routes and generating important statistical data for monitoring the waste collection accurately in terms of resource management and the provided services for the community. Citizens can easily access information about the public waste bins through the Web or a mobile application. The creation of the real prototype of the smart container, the development of the waste management application and a real-scale experiment use case for evaluation, demonstration, and validation show that the proposed system can efficiently change the way people deal with their garbage and optimize economic and material resources.

NOVELTY

In the current scenario, the word waste management holds much importance in every individual's life. Pollution and the generation of vast waste quantities with no proper waste management process have become one of humanity's biggest threats. This review article provides a complete review of the innovative technologies currently employed to handle and dispose of the waste successfully. This work

aims to include the different solid, liquid, gaseous, and radioactive waste management processes. The novel and improved plasma gasification concepts, transmutation, incineration, bio-refineries, microbial fuel cells (MFC) have been thoroughly explained. In addition, some new techniques like Mr. Trash Wheel and the Smart bin approach provide much hope of adequately managing waste. The work's novelty lies in adopting several successful methods of various countries for waste disposal and management. To incorporate or improve India'sIndia's same techniques and processes, we have to tackle the ever-increasing waste disposal problems and find economic and eco-friendly ways of waste management.

IDEA

Main concept to create a ideas to develop a smart waste management system

- • Smart Waste Bins.
- • Waste Level Sensors.
- • AI Recycling Robots.
- • Garbage Truck Weighing Mechanisms.
- • Pneumatic Waste Pipes.
- • Solar-Powered Trash Compactors.
- • E-Waste Kiosks.
- • Recycling Apps.

BUSINESS MODEL

A list of possible in business concept of smart waste management system

• City administration needs an understanding of the big picture, generating reports, control over pricing etc.

• District administrations are interested in controlling the process of waste collection, checking the quality of service (all waste collected, all in time, waste collected cleanly, waste transported to special places), quick and legal ways for solving disputes and problems.

• Municipalities can also deploy and maintain smart city infrastructure like capacity sensors in waste bins and wireless networks for data transferring.

• Waste trucks owning companies need a platform for organizing and optimization of their business process in general without serious investments in developing, deploying and supporting their own system. Such a system must include effective dynamic routing based on IOT data for the truck fleet. Besides, controlling drivers and tracking the fleet is also an important issue.

• Waste truck drivers need a navigation system for fulfilling their tasks. Another issue is reporting problems and passing them to the operators in the office instead of thinking about how to solve the problem, this can sufficiently save the time of a driver and vehicle. Drivers also need evidence that their work was done correctly and cleanly.

• Managers of dumps and recycling factories can publish their possibilities or needs in acquiring a certain amount of waste for storing or recycling.

• Staff that is responsible for trash bins in the current yards needs communications with waste management companies and truck drivers.

• Road police can get reports about inaccurate car parking that leads to the impossibility of waste collection. • Citizens want to have better service, lower cost and having easily accessible reports on what has been done and how much it cost

SOCIAL IMPACT

For this process, spatial resolution is introduced into the LCA process to account for impacts occurring at the local and regional levels. This has been done by considering social impacts on the local community and by use of a regional procedure for LCA data for emissions to the environment that may have impacts at the regional level.

The integration follows the structured approach of the pressure-state-response (PSR) model suggested by the Organisation for Economic Cooperation and Development (OECD). This PSR model has been extended to encompass nonenvironmental issues and to guide the process of applying multiple tools.

The framework primarily focuses on decision analysis and interpretation processes. Multiattribute utility theory (MAUT) is used to assist with the integration of qualitative and quantitative information. MAUT provides a well-structured approach to information assessment and facilitates objective, transparent decisions. A commercially available decision analysis software package based on MAUT has been used as the platform for the framework developed in this study

SCALABILITY OF SOLUTION

- Overflowing Garbage Bins: There is a chance that some days, a few garbage bins are full before their collection date which leads to overflowing. Again there is no alert mechanism for the garbage collector trucks which leads to a rotting and environmental mess.
- Excessive fuel usage: Unnecessary fuel usage as the garbage collector trucks visit each bin to collect garbage based on a fixed schedule whether it is full or not. Even if it is not fully based on a fixed schedule and route.
- Inefficient resource utilization: Excessive use of resources including manpower, vehicle, and fuel
- High cost: The inefficient mechanism leads to more labor and infrastructure costs