



CS6P05 Final Year Project

Draft Proposal

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PROJECT TITLE: WasteWise

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Introduction

In today's world, the increasing volume of waste, on the one hand, and inadequate methods of disposal are turning into serious environmental and health hazards. Conventional dustbins lack intelligent functionality that will help in effective sorting and waste management. To address the growing need for more efficient waste management, this proposal introduces **WasteWise: Sorting Smarter, Living Greener**. It aims at promoting accurate segregation of waste and its environmentally responsible disposal.

Problem Statement

According to an estimate by the World Bank report, What a Waste 2.0, landfill waste will increase by 70% by 2050. This creates severe ecological and logistical problems. A lot of this waste goes directly into landfills without proper segregation, thereby causing pollution and leading to the loss of valuable resources (*Global Waste to Grow by 70 Percent by 2050 Unless Urgent Action Is Taken*, 2018).

Proposed Solution

Smart Dustbin is essentially AI-powered and IoT-enabled to segregate garbage on its own into biodegradable and non-biodegradable categories to guide them into their respective compartments. AI-based waste classification and IoT data monitoring at both household and municipal levels upgrade the solution to make it smarter in solving global problems of waste efficiently and effectively.

Aim and Objectives

Aim: The main aim of this project is to design and develop an intelligent waste management system that applies AI and IoT technologies in the automation of the waste classification, segregation, and monitoring processes, hence promoting efficient waste disposal, reduction of environmental pollution, and offering support toward sustainable waste management practices.

Objectives:

- To design and implement a lid automation mechanism that uses sensors to detect proximity and automatically open or close the dustbin lid, improving user convenience and hygiene.
- To develop an AI-powered waste classification system capable of detecting and categorizing waste into biodegradable and non-biodegradable types, ensuring proper segregation and disposal.
- To integrate IoT-based monitoring and control features that allow real-time waste level tracking through a web application.
- To create a web application interface for seamless user interaction and management.
- To implement an error detection and correction mechanism that identifies misclassification in the system and allows for manual override.
- To incorporate data analytics capabilities for tracking waste generation patterns, system usage statistics, and providing insights for optimized waste management strategies.
- To ensure environmental impact and sustainability by reducing the amount of improperly disposed waste, minimizing landfill pollution, and encouraging recycling through automated waste segregation.

System Features

The potential features of the project are listed below:

- Ultrasonic Sensor for Lid Automation
 - Detects the proximity of the hand to automatically open the lid.
 - Closes the lid after a set time when no further motion is detected for hygiene and convenience.
- AI-Powered Waste Classification
 - Employs AI models in classifying waste into biodegradable and non-biodegradable.
 - Automatically segregates the wastes into the respective compartment as per the classification.
 - Recognizes various kinds of wastes like plastics, papers, and food wastes to classify them efficiently.
- IoT-Enabled Monitoring & Control
 - Allows remote monitoring in real time of the bin's status, like the waste level and compartment details.
 - Enables the lid operations remotely with a web application for end-user convenience.
 - Sends updates in real time with IoT to refresh the status and operate remotely.
- Integration with Web Application
 - Enables user to monitor segregation of waste or the status of the bin in real time.
 - Sends out notifications related to bin-full alerts or other critical notifications.
 - Remotely allows lid operation and system management.
 - Allows multiple users to access the bin's data and receive alerts.
- Error Detection and Correction
 - Detects misclassification of waste and sends a notification to the user by providing options for manual override.
- Data Analytics
 - Generates daily, weekly, and monthly reports on types and quantity of waste.
 - Usage statistics of the bins for insights into the pattern of waste generated and the activity of the bins.

References

Global Waste to Grow by 70 Percent by 2050 Unless Urgent Action is Taken. (2018, September 20). World Bank. Retrieved September 20, 2024, from <https://www.worldbank.org/en/news/press-release/2018/09/20/global-waste-to-grow-by-70-percent-by-2050-unless-urgent-action-is-taken-world-bank-report>