Patent Search

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Abstract:

The invention provides an AI-powered solar waste segregation system capable of autonomously identifying, classifying, and routing waste into designated bins. A camera r captures images of waste items, which are processed by a Raspberry Pi executing a trained convolutional neural network (CNN) to classify materials such as plastic, metal, and glass. Based on this classification, an Arduino-controlled servo mechanism directs the waste into the appropriate compartment. Ultrasonic sensors monitor bin fill leve while a GSM module transmits alerts when bins are full. A solar-panel-based power subsystem ensures uninterrupted, energy-efficient operation. The integrated AI, actuat monitoring, and renewable energy supply provide a compact, autonomous, and sustainable waste management solution.

Complete Specification

Description:FIELD OF THE INVENTION

[001] The present invention relates to the field of automated solid waste management systems and, more particularly, to an AI-powered solar waste segregation system utilizes image processing, deep learning algorithms, and embedded electronic control to classify and segregate waste materials into designated categories. The inventior further relates to intelligent waste-handling mechanisms integrating Raspberry Pi and Arduino-based control circuits, IoT-enabled monitoring, ultrasonic sensing, GSM communication, and solar-powered energy systems to enable autonomous, sustainable, and real-time waste segregation suitable for smart cities, municipal bodies, institutions, commercial establishments, and residential environments.

BACKGROUND OF THE INVENTION

[002] Effective solid waste management has become a critical challenge worldwide due to rapid urbanization, increasing population density, and rising volumes of munic waste. Conventional waste segregation practices rely heavily on manual sorting, which is labour-intensive, unhygienic, inefficient, and prone to human error. Additionally manual processes expose workers to hazardous materials, communicable diseases, and toxic substances, thereby raising significant health and safety concerns. Municip bodies and waste-handling agencies often encounter substantial operational costs and logistical difficulties in enforcing proper segregation at the source, resulting in mi waste streams that hinder recycling, increase landfill burden, and contribute to environmental pollution

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