Patent Search

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Abstract:

The present disclosure relates to systems and methods, and provides an IoT-based smart waste segregation system (100) configured to automatically segregate wast bin status in real time by fusing computer vision, embedded processing, actuators, and IoT cloud connectivity module (118). The IoT-based smart waste segregation s includes a computer vision waste classification model (106) trained on a labeled waste image dataset (108) to classify incoming waste into wet, dry, recyclable, and ele waste categories, a servo motor actuator array (110) operatively coupled to a waste directing mechanism (112) to route classified waste into designated compartmen compartment waste bin (116), and a cloud analytics and predictive monitoring platform (120) receiving per-compartment fill-level data via an IoT cloud connectivity m This configuration achieves increased waste segregation efficiency, reduced overflow incidents, and promotes smart city waste management initiatives.

Complete Specification

Description:TECHNICAL FIELD
[001] The present invention relates to smart waste management systems for urban areas, encompassing computer vision-based waste segregation, actuator-contro automated waste sorting, and real-time bin-level monitoring, and more particularly to an IoT-Based Smart Waste Segregation and Predictive Monitoring system incorporating cloud connectivity.
BACKGROUND
[002] The field of solid waste management in urban and semi-urban environments has witnessed considerable development over recent decades, encompassing mechanical sorting facilities, colour-coded bin systems, and route-optimised collection vehicles. Conventional approaches typically rely on physical separation infras deployed at centralised processing facilities, where waste arrives already commingled. Regulatory frameworks in India, including the Solid Waste Management Rule mandate source segregation into distinct streams; however, compliance mechanisms at the point of disposal remain largely manual and dependent on citizen awar resulting in inconsistent separation outcomes across residential, commercial, and public spaces.
[003] India generates in excess of sixty-two million tonnes of municipal solid waste annually, a figure that continues to rise in proportion to rapid urbanisation. Conventional collection systems typically transport unsegregated mixed waste to processing sites, where manual sorting introduces significant inefficiencies. Labou intensive segregation at centralised facilities may expose workers to health hazards, incurs recurring operational expenditure, and may result in cross-contaminatio between wet organic, dry recyclable, and electronic waste streams. Recycling recovery rates under such arrangements may remain below twenty percent, represent substantial loss of recoverable material value and compounding landfill pressure

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