SMART WASTE MANAGEMENT SYSTEM

FOR METROPOLITIAN CITIES

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Project Title: Internet of Things based Intelligent Waste Segregation and Management System for Smart Home Application.

Author: M. Bhuvaneswari; K. Tansin; S. Tazmeel Ahamed; N.Tharun Sri Ram; S. Venu Prasath

Published on: 2022 7th International Conference on Communication and Electronics Systems (ICCES)

Abstract:

The Internet of Things (IoT) has a significant impact on research for real time data monitoring. Waste segregation and control based on IoT is a significant task in metropolitan cities and municipal corporations. The advancement of key enabling technologies dependent on IoT enabled devices. Waste segregation and disposal mechanisms are among the severe problems associated with smart cities, which have a negative impact on our society and health. The trash bin monitoring and control is carried out through a microcontroller is proposed in this work. An IoT enabled smart bin utilizes a microcontroller with multiple sensors will control the process. In this paper, use inductive proximity sensors to detect metal trash, while temperature and humidity sensors are used to segregate as wet and organic wastes. The bin filling level is monitored using Infrared sensors. IoT with sensor communication module allows remote control of real-time data collection at each home. While Bluetooth allows for short-range waste monitoring via a mobile app. Waste is piled at various levels in the trash bins. The centralized controller is enabled and the filled bins are managed effectively with the deep learning technique. The waste collection is monitored by setting up a training model based on Deep Learning (DL). The intelligent GUI will track the unfilled levels of each trash bin as proposed.

Project Title: Smart waste management using Internet of Things: A survey

Author: K N Fallavi; V Ravi Kumar; B M Chaithra

Published on: 2017 International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud) (I-SMAC)

Abstract:

At present solid waste management is a major concern in the metropolitan cities of the developing and developed countries. As the population is growing, the garbage is also increasing. This huge unmanaged accumulation of garbage is polluting the environment, spoiling the beauty of the area and also leading to the health hazard. In this era of Internet, IOT (Internet of Things) can be used effectively to manage this solid waste. In this paper, we have discussed the definition of Internet of Things and its elements, testing and prototyping tool cooja simulator and finally the study of various literatures available on smart waste management system using IOT.

Project Title: Smart Prediction and Monitoring of Waste Disposal System Using IoT and Cloud for IoT Based Smart Cities

Author: Jacob John, Mariam Sunil Varkey, Riya Sanjay Podder, Nilavrah Sensarma, M. Selvi, S. V. N. Santhosh Kumar, Arputharaj Kannan

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Abstract:

One of the prominent applications of Internet of Things (IoT) in this digital era is the development of smart cities. In IoT based smart cities, the smart objects (devices) are connected with each other via internet as a backbone. The sensed data by the smart objects are transmitted to the sink for further processing using multi hop communication. The smart cities use the analyzed data to improve their infrastructure, public utilities and they enhance their services by using the IoT technology for the

betterment of livelihood of the common people. For IoT based smart cities, waste collection is a prominent issue for municipalities that aim to achieve a clean environment. With a boom in population in urban areas, an increasing amount of waste is generated. A major issue of waste management system is the poor process used in waste collection and segregation. Public bins begin to overflow for a long period before the process of cleaning starts, which is resulting in an accumulation of bacteria causing bad odors and spreading of diseases. In order to overcome this issue, in this paper an IoT based smart predication and monitoring of waste disposal system is proposed which utilizes off-the-shelf components that can be mounted to a bin of any size and measure fill levels. An Arduino microcontroller is employed in the proposed model to interface the infrared (IR), ultraviolet (UV), weight sensors, and a Global Positioning System (GPS) module is used to monitor the status of bins at predetermined intervals. The proposed system transmits the data using the cluster network to the master module which is connected to the backend via Wi-Fi. As data is collected, an intelligent neural network algorithm namely Long Short-Term Memory (LSTM) is used which will intelligently learn and predict the upcoming wastage from waste generation patterns. Moreover, the proposed system uses Firebase Cloud Messaging to notify the appropriate people when the bins were full and needed to be emptied. The Firebase Cloud Messaging (FCM) JavaScript Application Programming Interface (API) is used to send notification messages in web apps in browsers that provide service work support. Hence, the proposed system is useful to the society by providing facilities to the governments for enforcing stricter regulations for waste disposal. Additional features such as automated calibration of bin height, a dynamic web data dashboard as well as collation of data into a distributed real-time firebase

database are also provided in the proposed system.

Project Title: Smart Waste Management System for Crowded area : Makkah and Holy Sites as a Model

Author: Rasha Elhassan; Mahmoud Ali Ahmed; Randa AbdAlhalem

Published on: 2019 4th MEC International Conference on Big Data and Smart City (ICBDSC)

Abstract:

In implementing the smart cities the great challenge is how to manage waste with low cost and high performance. Waste has a negative impact in the society quality which smart city aims to improve it. Makkah and holy sites [Mona, Arafat, and Muzdalifah] are very congested areas where waste management is a big challenge. Three factors make it a big challenge, behind its natural, small area, short period of time and the increasing of the Pilgrimages' member. The process of collected wastes, separated it, and transports the containers daily and quickly to avoid any prospect of a spread of diseases is a complex process. This paper aims to study the concept of the waste management and proposed smart systems for waste management system with recycling .The proposed system will use the sensors technique insite the container, as a lower level, to separate the waste into 4 categories [food, plastics, papers, and metal] and use actuator at a top level to inform the management system to collect the container. The proposed system will save time, money and efforts compared to the recent process of the waste management system and improve the society quality as all.

Project Title: IoT-Enabled Smart Waste Management Systems for Smart Cities: A Systematic Review

Author: INNA SOSUNOVA AND JARI PORRAS

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Abstract:

With urbanization, rising income and consumption, the production of waste increases. One of the most important directions in the field of sustainable development is the design and implementation of monitoring and management systems for waste collection and removal. Smart waste management (SWM) involves for example collection and analytics of data from sensors on smart garbage bins (SGBs), management of waste trucks and urban infrastructure; planning and optimization of waste truck routes; etc. The purpose of this paper is to provide a comprehensive overview of the existing research in the field of systems, applications, and approaches vis-à-vis the collection and processing of solid waste in SWM systems. To achieve this objective, we performed a systematic literature review. This study consists of 173 primary studies selected for analysis and data extraction from the 3,732 initially retrieved studies from 5 databases. We 1) identified the main approaches and services that are applied in the city and SGB-level SWM systems, 2) listed sensors and actuators and analyzed their application in various types of SWM systems, 3) listed the direct and indirect stakeholders of the SWM systems, 4) identified the types of data shared between the SWM systems and stakeholders, and 5) identified the main promising directions and research gaps in the field of SWM systems. Based on an analysis of the existing approaches, technologies, and services, we developed recommendations for the implementation of city-level and SGB-level SWM systems.