SERIAL NO :01

YEAR OF PUBLISHING :JANUARY 2021

AUTHOR NAMES :

Prof. Aderemi A. Atayero Ph.D, M.Sc., B.Sc.

Rotimi Williams

TITTLE OF PROJECT :

Smart Waste Management System Using Internet of Things and Cloud Computing

ABSTRACT :

**Indiscriminate disposal of solid waste is a major issue in urban centers of most developing countries and it poses a serious threat to healthy living of the citizens. Access to reliable data on the state of solid waste at different locations within the city will help both the local authorities and the citizens to effectively manage the menace. In this paper, an intelligent solid waste monitoring system is developed using Internet of Things (IoT) and cloud computing technologies. The fill level of solid waste in each of the containers, which are strategically situated across the communities, is detected using ultrasonic sensors. A Wireless Fidelity (Wi-Fi) communication link is used to transmit the sensor data to an IoT cloud platform known as ThingSpeak. Depending on the fill level, the system sends appropriate notification message (in form of tweet) to alert relevant authorities and concerned citizen(s) for necessary action. Also, the fill level is monitored on ThingSpeak in real-time. The system performance shows that the proposed solution may be found useful for efficient waste management in smart and connected communities.**

**DESIGN METHODOLOGY :**

The ultrasonic sensor is made up of four pins which are Vcc, echo, trigger and ground. For the implementation, the echo pin is connected to pin 4 and the trigger pin to pin 5 of the Arduino microcontroller. The power source, Vcc, is connected to the microcontroller’s 5V output pin, and the ground (Gnd) is connected to the ground of the microcontroller. The module is powered with a 3.3V source gotten from the out-put pin of a regulator connected to 9V. It comprises of a total of 8 pins but only 6 are used for interfacing with the microcontroller. The module communicates serially via its transmitter (TX) pin directly connected to the receiver (RX) pin of the controller and the receiver (RX) pin connected via a voltage divider configuration to the control-ler’s transmitter (TX). The rest of the pins which are the chip power down (CH\_PD), Vcc and reset are connected to a positive supply, with ground (GND) tied to negative.

**ALGORITHM:**

**the waste content of the bin using an RFID tag attached toeach bin. The purpose of the tag was to monitor and track the bin while collecting thewaste. The camera was attached to the truck to collect images of the bin whenever itenters the bin’s area in order to take images before and after collecting the waste.The proposed system in [10] utilized sensors and a radio frequency transmitterto embody a smart trash system. Two sensors were employed for the monitoring. Thetwo sensors which were used are an IR proximity sensor which detects the level of thewaste in the smart bin and a load sensor which senses and measures the load of thewaste in the bin. When the bin is filled up to a specific load and level, it generates asignal that is sent by the RF transmitter. The local base station receives then receives the transmitted signal**

**FINDING FOR EVALUATION :**

**Next plan is I am insert a servo motor . It used open & close dustbin door.Because it reduce the door opening time.**

**ADVANTAGES :**

* Improve Productivity and Performance.
* Increase Profitability.
* Boost Sustainability.t.
* Become a Smart City.
* Enhance Safety.

**DIS ADVANTAGES :**

* The process is not always cost-effective: ..
* The resultant product has a short life: ...
* The sites are often dangerous: ...
* Waste management can cause more problems:.

**S.NO : 2**

**YEAR :APR 2018**

**AUTHOR NAME:**

**Pooja V. Garach1, Rikin Thakkar2**

**TITLE OF THE PROJECT :**

**Design and Implementation of Smart Waste Management System using FOG computing**

**ABSTRACT :**

*Waste collection and to dispose is one of the biggest issue that world is facing. This requires huge expenditure and more costing includes manpower, collection bin vehicle cost, fuel cost, and proper ways to dispose it. This factor led the necessity of designing, implementing and executing an intelligent smart waste management system for proper dispose of waste. This paper concentrates on the implementation of Smart waste management using FOG computing. This system uses ultrasonic sensor for sensing the level of waste and using Arduino node MCU it will send the data to the server and from which it will analyze the filled level and according to which the collector truck will go for collection as per the optimized route generated. This system provides the efficient solution for the waste management system*

**DESIGN METHODOLOGY :**

A computer scientist Edger Dijkstra proposed Dijkstra's algorithm, [8] in 1956 and published in 1959. Dijkstra algorithm solves the single-source shortest path problem for a graph with non-negative edge path costs results in a shortest path tree. This algorithm is often used in routing and as a subroutine in other graph algorithms. For a given source vertex (node) in the graph, the algorithm finds the path with lowest cost (i.e. the shortest path) between that vertex and every other vertex [8].

**ADVANTAGES :**

**Latency Reduction. Reduced latency is the primary benefit of edge and fog computing. ...**

**Improved Response Time. ...**

**Enhanced Compliance. ...**

**Increased Security. ...**

**Greater Data Privacy. ...**

**Reduced Cost Of Bandwidth. ...**

**Overall Increase In Speed and Efficiency. ...**

**Less Reliance on WAN Services.**

**DIS ADVANTAGES :**

Increased Design Complexity. The use of more sophisticated edge IoT, user devices, and fog nodes on your network will increase complexity and overall support requirements.

Physical Security Considerations. ...

Decentralized device

**CONCLUSION :**

This paper shows the smart waste management system by using smart bins giving its filling level to the server. By implementing this system it reduces time , cost and optimizes routes . Our system informs the status of bins to the garbage collector and which will collect garbage as per shortest path generated on the level of filled bins. Optimized routed is obtained using the MATLAB.

**SO.NO : 3**

**YEAR : May -2017**

**AUTHOR NAME :**

**P. P. Kale, S. R. Salunkhe, S. B. Dhole,V. V. Bansode**

**TITLE OF THE PROJECT :**

**Analysis on Smart Waste Management System for Smart Cities using IOT**

**ABSTRACT :**

**Cities round the world square measure on the run to finish up smarter. variety of those have seen a chance on deploying devoted municipal access networks to help every type of town management and maintenance services requiring Associate in Nursing data affiliation. We have a tendency to demonstrate however net of things (IoT) integration wit h statistics get entry to networks, Geographic data systems (GIS), combinatorial improvement, and digital engineering will contribute to boost cities management systems. we have a tendency to gift a waste assortment answer supported providing intelligence to trashcans, by manner of exploitation Associate in Nursing IoT image embedded with sensors, which may study, collect, and transmit trash volume information over the web. This records placed into a spatiotemporal context and processed by graph thought improvement algorithms could also be wont to dynamically and efficiently manage waste series techniques. Key Words: Waste assortment, Smart City, net of Things (IoT), Geographic data system (GIS), Dynamic provision Management, Location Intelligence.**

**DESIGN METHODOLY :**

**IoT devices turn this model on its head by using smart trash bins to detect location, temperature, and fill level in real time, and this data is then used to plan optimal collection routes, resulting in an efficient pickup process that saves fuel as well as manpower.**

**FINDING EVALUATION :**

**A waste assessment identifies waste generated at a facility, and purchasing and management practices; examines current waste reduction practices and assesses their effectiveness; and identifies the areas and materials in which waste reduction efforts will be most effective.**

**ADVANTAGES :**

* **LOWER COST**
* **LESS WEAR AND TEAR**
* **IMPROVED CLEANLINESS IN PUBLIC AREAS**

**MORE EFFECTIVE MANAGEMENT**

**DIS ADVANTAGES :**

**System requires more number of waste bins term separate waste collection**

**CONCLUSION :**

**Smart waste management is characterized by the**usage of technology in order to be more efficient when it comes to managing waste**. This makes it possible to plan more efficient routes for the trash collectors who empty the bins, but also lowers the chance of any bin being full for over a week!**

**S.NO : 04**

**YEAR OF PUBLISHING : MAY 2018**

**AUTHOR :**

**Dr.N.SATHISH KUMAR#1, B.VIJAYALAKSHMI#2, R. JENIFER PRARTHANA#3, A .SHANKAR**

**TITLE OF PROJECT :**

**IOT Based Smart Garbage alert system using Arduino UNO**

**ABSTRACT :**

**Waste management** is **one of the primary**

**problem that the world faces irrespective of the case**

**of developed or developing country. The key issue in**

**the waste management is that the garbage bin at**

**public places gets overflowed well in advance before**

**the commencement of the next cleaning process. It**

**in turn leads to various hazards such as bad odor &**

**ugliness to that place which may be the root cause**

**for spread of various diseases. To avoid all such**

**hazardous scenario and maintain public cleanliness**

**and health this work is mounted on a smart garbage**

**system. The main theme of the work is to develop a**

**smart intelligent garbage alert system for a proper**

**garbage management .This paper proposes a smart**

**alert system for garbage clearance by giving an alert**

**signal to the municipal web server for instant**

**cleaning of dustbin with proper verification based**

**on level of garbage filling. This process is aided by**

**the ultrasonic sensor which is interfaced with**

**Arduino UNO to check the level of garbage filled in**

**the dustbin and sends the alert to the municipal web**

**server once if garbage is filled . After cleaning the**

**dustbin, the driver confirms the task of emptying**

**the garbage with the aid of RFID Tag. RFID is a**

**computing technology that is used for verification**

**process and in addition, it also enhances the smart**

**garbage alert system by providing automatic**

**identification of garbage filled in the dustbin and**

**sends the status of clean-up to the server affirming**

**that the work is done.**

**DESIGN METHODOLOGY :**

**this process is aided by the ultrasonic sensor which is interfaced with Arduino UNO to check the level of garbage filled in the dustbin and sends the alert to the municipal web server once if garbage is filled. After cleaning the dustbin, the driver confirms the task of emptying the garbage with the aid of RFID Tag.**

**FINDING FOR EVALUATION :**

**Using this data, the IoT enterprise solution can select optimum routes for waste collectors with areas in urgent need of cleanup on priority while avoiding disposal units that still have room. This results in an efficient pickup process, which doesn't consider empty trash bins, saving fuel as well as manpower costs.**

**ADVANTAGES :**

**Reducing waste will not only protect the environment but will also save on costs or reduce expenses for disposal. In the same w ay, recycling and/or reusing the waste that is produced benefits the environment by lessening the need to extract resources and lowers the potential for contamination.**

**DISADVANTAGES :**

**According to the author there may be several disadvantages such as increasing cost of the dustbin.**

**For example, if there are three different levels then three sensors has to be placed; one sensor for each level.**

**Also rough action and usage of the user may cause damages to the sensors.**