

WASTE MANAGEMENT SYSTEM USING IOT

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Abstract

This paper gives the information about the waste garbage management in a smart way. Internet and its applications have become an integral part of today's human lifestyle. It has become an essential tool in every aspect. Due to the tremendous demand and necessity, researchers went beyond connecting just computers into the web. These researches led to the birth of a sensational gizmo, Internet of Things (IOT). Communication over the internet has grown from user - user interaction to device - device interactions these days. The IOT concepts were proposed years back but still it's in the initial stage of commercial deployment. IOT can be used to provide a platform for smart garbage management. Some of the commonly used methods are implemented using sensors and microcontrollers.

Keywords: - *IOT, Communication, Smart garbage management*

Introduction

Internet and its applications have become an integral part of today's human lifestyle. It has become an essential tool in every aspect. Due to the tremendous demand and necessity, researchers went beyond connecting just computers into the web. These researches led to the birth of a sensational gizmo, Internet of Things. Communication over the internet is grown from user-user interaction to device - device interactions these days. Typically, IOT offers advanced connectivity of devices, systems, and services that go beyond machine-machine communications and covers a variety of protocols, domains, and applications. The interconnection of these embedded devices (including smart objects), is implemented in nearly all fields of automation enabling advanced applications like a Smart Grid. The term-things in the IoT refers to a wide variety of devices such as heart monitoring implants, biochip transponders on farm animals, electric clams in coastal waters, automobiles with built-in sensors, or field operation devices that assist fire-fighters in search and rescue. Current market examples include smart home and smart cities.

IMPLEMENTATION

The main flow chart describes the working of all the components, whenever rain is detected the lid will be closed else the lid is open, thereby we can avoid rain water into trash bins. Here, in case of ultrasonic sensor, when it reaches above the threshold value, the message will be sent to the authority person, message includes “Bin is Full” and “latitude and longitude” information of the bin. Here authority has all rights to access the information of the bin by making use of WIFI and if required he can turn ON the motor and can turn it OFF if required.

In case of wet bin, if the bin is full, then we are crushing the wet waste and making that particular waste into manure, mechanism involves in webpage if we are turning ON means the motor starts rotating and again in web page if we are pressing off means motor stops. PIR sensor senses the human followed by the voice will be played by using voice recorder, voice played will consist of dry trash bin or either wet trash bin, and thereby garbage will be dumped in the particular trash bin, in order to avoid confusions.

Waste is pushed onto a conveyer belt for detection with the inductive sensor to detect it is metal or nonmetal. If it is detected metal, Servo motor rotates to in a direction to collect the metallic waste, for nonmetal it moves further to fall into the non-metallic bin.

Step 1: Website creation and hosting.

Step 2: The people can request the dustbin to their area by registering into our website.

Step 3: Our system will be installed to their location with the help of latitude and longitude.

Step 4: Our system will sense the type of garbage by using some sensors and it will segregate it to a different compartment.

Step 5: The status of the bin is sent to the respective authority and registered users using the GSM module.

Step 6: The cleaning authority can easily spot the bin location through the GPS module

COMPONENT USED

A. ARDUINO UNO (ATMEGE328) –

The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6-analog inputs, a 16 MHz

crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega8U2 programmed as a USB-to-serial converter.

B. ULTRASONIC SENSORS –

Ultrasonic sensors are used to detect the level of bin. A set of 2 ultrasonic sensors are been placed at an angle of 120 degrees from each other so that the whole area of the bin is covered. The range of ultrasonic sensor may be vary according to the size of the dustbin. The waste in the garbage bin may be of any state. Considering all the parameters, the specifications of the ultrasonic sensors can be implemented

C. PIR SENSORS –

PIR sensor is an electronic sensor that measures infrared light radiating from objects in its field of view. It is most Officially used in PIR-based motion detectors

D. AMBIENT SENSORS –

It is a digital Ambient light sensor IC for I2C bus interface. This IC is the most suitable to obtain the ambient light data for adjusting LCD and keypad back light power of mobile phone. It is possible to detect wide range at high resolution. COMMUNICATION MODULE

E. GSM (Global system for mobile communication) –

GSM/GPRS Modem-RS232 is built with Dual Band GSM/GPRS engine- SIM900A, works on frequencies 900/1800MHz. The Modem is coming with RS232 interface. The GSM/GPRS Modem is having internal TCP/IP stack to enable you to connect with internet via GPRS. It is suitable for SMS, Voice as well as DATA transfer application in M2M interface. The onboard Regulated Power supply allows you to connect wide range unregulated power supply. Using this modem, you can make audio calls, SMS, Read SMS, attend the incoming calls and internet etc. through simple AT commands.

F. GPS (Global positioning system)-

It is a global navigation system that provides geo-location and time information to a GPS receiver anywhere on or near the earth where there is an unobstructed line of sight to four more GPS satellites.

System Testing

The testing is a process of checking the working of software and hardware products. Testing of software is called software testing and testing of a hardware product is called hardware testing. Software testing is the process of testing the software or application developed by developers or programmers. Software testing is the process of checking whether the developed system is working according to the original objectives and requirements. Software testing process commences once the program is created and the documentation and related data structures are designed. Software testing is essential for correcting errors. Otherwise, the project is not aid to be complete. The system should be tested experimentally with test data so as to ensure that the system works according to

their required specification. When the system is found working, test it with actual data and check performance. Software testing is a critical element of software quality assurance and represents the ultimate review of specification, design, and coding. Hardware testing is a process of testing the hardware products developed by hardware developers. The most commonly used testing's are unit testing and system testing.

CONCLUSION

This project work is implementation of smart garbage management system using Ultrasonic sensor, PIR sensor, microcontroller, GSM, GPS and Wi-Fi module. This system assures the cleaning of trash bins, soon when the garbage level reaches its maximum, a message is sent to the authority. This reduces the total number of trips of garbage collection vehicle and hence reduces the overall expenditure associated with the garbage collection. It ultimately helps to keep cleanliness in the society. Therefore, the smart garbage management system makes the garbage collection more efficient. Here we are using servo motor implemented with rain sensor, if rain occurs then lid will be closed, else lid will be open. In case of wet trash can we are using dc motor and blades for decomposing it and it is used for crops. In case of street lights, we are monitoring it by using ambient sensor, if luminous value is more, lights will be turned OFF else it will be ON. If any obstacle is detected then all the lights will be ON else alternate lights will be ON.

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