

GARBAGE MONITORING USING TECHNIQUES of INTERNET of THINGS and ARDUINO TOOL

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Abstract:

Most of the times it is being observed that the garbage becomes overflow in our surroundings that causes of several diseases. It is necessary to protect people from the pollution produced from the garbage. This situation can be avoided by the proper handling of the garbage using the techniques of internet of things. "Garbage Monitoring system" using IOT techniques is being proposed here. This system has been implemented using microcontroller which is integrated with the sensors for monitoring the garbage. Multiple dustbins will be located across the area and this system will monitor the level of garbage using IOT techniques. Every dustbin has its unique ID for uniquely identifying a dustbin in a particular area. For every dustbin, a threshold value is decided so that if the level of garbage crosses its threshold value then the device will send the signal to the authority with the help of Arduino tool and IOT techniques. We will be implementing the k-means clustering algorithm to form the clusters of the days according to the percentage of garbage collected so it will be easy to predict the garbage collection and notify accordingly. These details can be accessed by the authorized personnel from their place and action can be taken in shorter time to maintain the dustbins.

Keywords —Arduino Microcontroller, Internet of things,Ultrasonic sensor,IRsensor,Moisture Sensor, DC Motor, Power supply.

I. INTRODUCTION

The garbage management and monitoring system is a challenging problem in today's scenario of metropolitan cities. There is a need for well-organized waste collection and disposal system. Due to increased population the garbage bins placed in the streets are flooding and due to the late disposal of

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he garbagebinswhichisconnectedtotheserverviaInternet of things.Wastemanagementisveryimportantforthecitiesfor proper disposal of waste for which accurate detection of waste level in the bins is important. (IoT) is expected to offer advanced connectivity of devices, systems, and services that goes beyond machine-to-machine (M2M) communication and covers a variety of protocols, domains, and applications. The proposed system consists of raspberry pi processors and sensors which accuratelydetectthelevelofgarbageandthegaslevelinthe garbagebinswhichisconnectedtotheserverviaInternet of things.Wastemanagementisveryimportantforthecitiesfor proper disposal of waste for which accurate detection of waste level in the bins is important. The existing System consists of humans directly checking the bins at aregular interval manually But due to the laziness of the working peopleinthemunicipalityorthetimemanagementproblems can lead to delay of disposal of waste in the garbage bins whichmayspillinthestreetsandcreateunwantedsmelland gaseswhichmaycauseseveralproblemstothepeopleliving inthoseareas.

LITERATURE REVIEW

Before going into the main points of our Iot based mostly good Garbage Management system, we are going to Re read a number of the prevailing system in vogue referring to good garbage System within the traditional Garbage Management, the Municipal companies square measure assigned to position huge dustbins within the society for the gathering of the rubbish and waste. Once the bin gets stuffed, bin gets clean by the rubbish collector and bin collected square measure disposed somewhere acceptable. This technique got no correct oversight from the corporation for cleanup the bin frequently that creates dirtiness on the streets and roads and unfolds diseases. Therefore consequently some

initiative has been planned in developing IoT Technology for Garbage Management.

METHODOLOGY

The block diagram of the monitoring system. It consists of several ultrasonic sensors, the Arduino Uno microcontroller, and the GSM module. IRsensortocalculatetheIRcount,mq2gas sensor used to measure the level of gases in the bin. GPS sensorcanbeusedtotrackthebinswhichareoverdumped andreleasingharmfulgases in the case where the bins are already full or almost full, and then it will generate a warning message which will be sent to themunicipality via SMS, by using the GSM module. This system uses raspberry pi to operate the sensors such as the ultrasonic sensor to measure the distance of the waste inside the bin the data from the sensor can be collected using the raspberry pi and processed for analog to digital conversion. These data are send to server which is interfaced to the Rpi via Linux OS each sever has a dynamic or static IP address. These data can be analyzed by login to the server. A notification will be sent to the mail or phone. Python programming can be used to program the sensors to the raspberry pi. Webpage is created using HTML.

BLOCK DIAGRAM OF PROPOSED SYSTEM

SYSTEM DESCRIPTION

In “**Smart garbage monitoring system**” the level of garbage in dustbin is detected with the help of sensor system and communicates to the authorized control room and a notification will be sent to the mail or phone.

1. ARDUINO UNO MICROCONTROLLER

Arduino Uno is a microcontroller board developed by Arduino.cc and based on Atmega328. It is a very valuable addition in the electronics that consists of USB interface, 14 digital I/O pins, 6 analog pins, and Atmega328 microcontroller. It is an open-source platform, means the boards and software are readily available and anyone can modify and optimize the boards for better functionality.

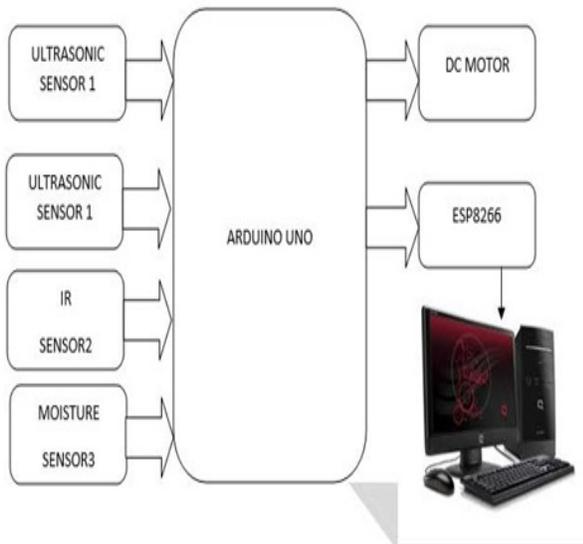


It has 14 digital input/output pins. The Arduino Uno can be powered via a USB connector or with an external power supply and the power source is selected automatically.

2. ULTRASONIC SENSOR

An ultrasonic sensor is an instrument that measures the distance to an object using ultrasonic sound waves. It uses a transducer to send and receive ultrasonic pulses that relay back information about object.

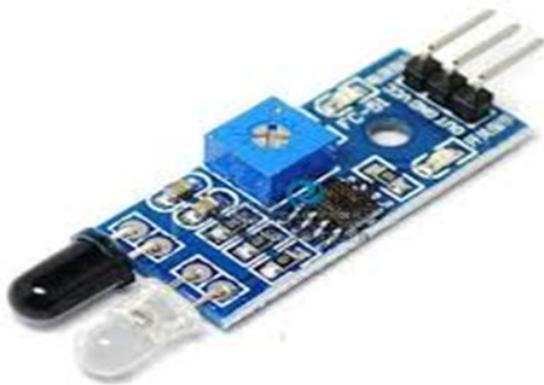
Ultrasonic sensor module HCSR04 provides measurement up to 400 cm. It could be accurate up to 3mm. The module consists of a transmitter and a receiver. The IO trigger provides the trigger for the transmitter which sends the echo wave to the target. After hitting the target the wave is reflected back and sends to the receiver. The receiver receives the wave and the distance of the target object can be calculated easily by the simple formula



(distance=speed*time). The ultrasonic sensor can be used to find the level of garbage in the bins. The sensor can be fixed to the lid of the bin. It avoids flooding of wastes in the bin.



3. IR



SENSOR (INFRAREDSSENSOR)

An IR sensing element could be a device that detects IR radiation falling thereon. Distinction sensors (used in line following robots) and obstruction counters/sensors (used for tally product anin stealer alarms) aresomeapplic ationsinvolvingIRsensors.

When the IR sensing element doesn't receive a proof the junction rectifier doesn't glow. The voltage at the inverting output goes high than the non-inverting input of the comparator. Once IR sensing element receives the signal the other way around of the operation happens and therefore the inverting input goes low than the non-inverting input of the comparator. The output of the comparator goes high and therefore the junction rectifier starts glowing. This happens whenever associate degree object crosses the receiver module. Resistors are used to permit minimum current to taste the junction rectifier devices. The IR sensing element is accustomed notice the IR count and it is connected to the raspberry pi module. This will be placed within the garbage bins to search out the amount of things born into the bins.

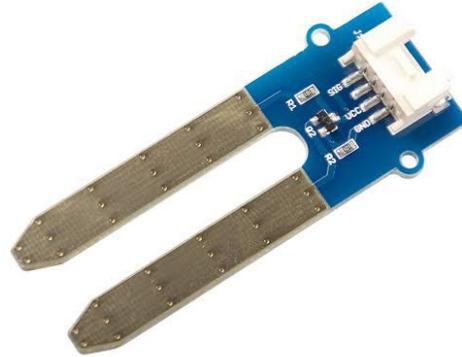
4. MOISTURE SENSOR

The Moisture sensor is the wet device is employed to live the water content (moisture) of soil. Once the soil has water shortage, the module output is at high level; else the output is at low level. This detector reminds the user to water their plants and conjointly monitors the wetness content of soil. It has been wide employed in agriculture, land irrigation and biological science farming.

The Soil wetness detector uses capacitance to live insulator permittivity of the encompassing medium. In soil, insulator permittivity may be operate of the water content. The detector averages the water content over the complete length of the detector. There's a two cm zone of influence with relation to the flat surface of the detector, however it's very little or no sensitivity at the acute edges. The Soil wetness detector is employed to live the loss of wetness over time because of evaporation and plant uptake, evaluate optimum soil wetness contents for varied species of plants, monitor soil wetness content to regulate irrigation in greenhouses and enhance bottle biology experiments.

5. POWERSUPPLY

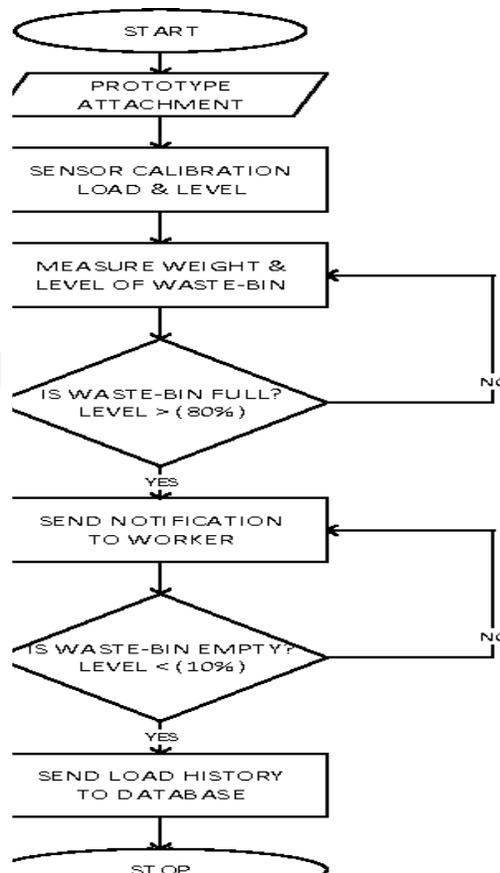
The unit is powered by a 5v power supply which may from a standard USB mobile charger or from a normal socket. The power supply can also be reduced using a circuit which consists of a step down transformer, Bridge rectifier, Capacitors and a DC voltage regulator. It may be connected to the monitor via the HDMI cables and this acts as a processor for the computer.



APPLICATION

- Lowers waste and recycling costs by reducing the number of times compactor(s) are emptied.
- Reducing the environmental hazards to the residents.
- Saving tax payers money to pay less on the garbage collection fees.
- New products such as advertisement on smart can may be included.
- Local event signage can be posted electronically.
- This can be best used by Municipal Corporation for their betterment of management regarding collection of wastes.
- With the help of proper technology (GSM & SOFTWARE APPLICATIONS) we can guide the trucks to choose the shortest path.

FLOW CHART



FUTURE SCOPE

Future Work for the projected system as follows, in projected model we tend to connected single ashcan to cloud to urge the info more we'll connect the complete ashcan along. Knowledge of ashcan will be checked in cloud info more we'll style an internet portal to attach the complete ashcan along. More indication are given to the user to maneuver left or right facet by once ashcan is full. More all the ashcan full knowledge can along sent to the authorities with a brand new algorithmic rule. more push are given to ashcan to figure in manual mode once cleaners collect the rubbish and additionally The scope for future work is that the implementation of same system with less complicated boards at cheap prices.

CONCLUSION

Research has been done in employing IoT based technology in monitoring the status of towards collecting the garbage once threshold reached. There were sure drawbacks within the existing IoT based mostly} system that diode to the event of IoT based sensible Garbage Management System using super sonic sensors. The proposed system consists of smart garbage bins which will be of greater use in future cities. The developed system provides future scope for the smart cities to keep the cities clean. The system can be used for residential purpose also. The data send related to the garbage management to the server can be analyzed and cleaning process can be done.

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