

A REVIEW ON SMART GARBAGE DUSTBIN

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Abstract

This project smart garbage dustbin system is a very smart system which will help to keep our cities clean. In several urban areas although the dustbins are provided so that it can be used by the people but without proper maintenance of waste which cause a major factor for environment pollution and also destroying our environment day by day also resulting severe adverse effects for mankind. In the traditional system, the garbage uses to be collected in a manual way. So that time is consumed. This project which can reduce their time and effort in efficient manner. Automation is the most demandable feature now a day. For this purpose, smart dustbins are the much suitable approach. It will be helpful to develop green and smart city. For this we have to develop an automatic smart dustbin which will first be able to detect the current status of the garbage bin send the information to the garbage collection vehicle employee. They can immediately take action to empty. It ultimate helps to keep cleanness in the society and hence the expansion of diseases caused by waste material is reduces.

Keywords: - smart garbage dustbin, microcontroller, monitoring, sensors, vending machine.

1. Introduction: -

This smart garbage dustbin is a very innovative system which will help to keep the cities clean. This system monitors the garbage bins and informs about the level of garbage collected in the garbage bins. For this the system uses ultrasonic sensors placed over the bins to detect the garbage level and compare it with the garbage bins depth. The overflowing of the garbage bins is very common in many cities, but this will impact our society and our surroundings. It will damage the environment day by day to cause the many types of pollution along with to create many diseases for human and other animals also. We proposed smart dustbin system which will monitor and alert when the garbage level crosses the threshold level of the garbage bin. This process will be carried out with the help of sensors, ATMEGA16 and ESP8266. Now days in most cities there are many dustbins which are in bad conditions. The garbage in a dustbin are all overflowed of the dustbin. Many people are throwing garbage on that dustbin which are already full or overflowed. Due to this unclean of garbage bins pollution is increases which are bad for the environment. This creates a very bad look of the city which is a way to support to the air pollution and to some harmful diseases which are easily spreadable. For this we have to develop an automatic dustbin which will detect the garbage is dry or wet then separate the garbage and informs about the level of garbage collected in the garbage bin to a person in the garbage collecting vehicle and by using vending machine coins comes out the smart dustbin. This system helps to city clean and green.

2. Block Diagram: -

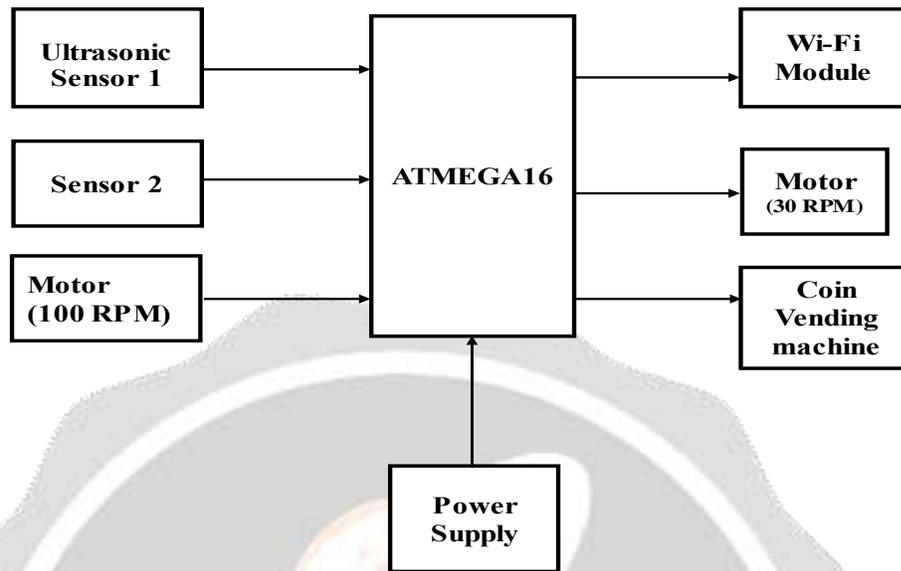


Fig.1 – Block Diagram

3. Literature Survey: -

A Smart Waste Bin for Smart Waste Management proposed by [1], In this paper, the system consists of sensors to measure the weight of waste and the level of waste inside the bin. Bluetooth is attached for short range communication. The researchers [2] suggests the method for garbage management which is as follows. In this paper, 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. The researchers [3] suggests the method for garbage management which is as follows. In this paper the system makes use of Arduino Uno board, LCD screen, GSM modem for sending data. The system is powered by a 12V transformer. The LCD screen is used to display the status of the level of garbage collected in the bins. Whereas GSM is built to show the status to the user, monitoring it with SMS. The SMS consists of text related to all garbage bins. The LCD screen shows the status of the garbage level. The system puts on LCD screen continuously monitoring of garbage with Arduino board. . The researchers [4] suggests the method for garbage management which is as follows. In this paper the bin was connected with a microcontroller-based system which had IR wireless system with a main central system that shows the current status of the garbage bin. The status was seen on a mobile based web browser with html page by using Wi-Fi. in this system to reduce the cost they used weight sensor and on the sender's side they used a Wi-Fi module to send and receive the data. In the end the weight sensor only detects the weight of the garbage in the bin but not the level of waste.

4. Proposed system: -

This paper proposing new garbage collecting way to dispose the waste by using the help of these sensors' authorities can get information about the bin is over flowing by the information given by sensor then they can easily find out the bin in which located and squash it as early possible. When garbage throw in dustbin. motor rotate according sensor and then wet and dry garbage is separated. A conveyer belt rotates and comes out coins.

5. Hardware: -

5.1. HC - SR04 Ultrasonic Sensor: -

This sensor is a very popular sensor used in many applications where measuring distance or sensing objects are required. The module has two eyes like projects in the front which forms the Ultrasonic transmitter and Receiver. The Ultrasonic transmitter transmits an ultrasonic wave, this wave travels in air and when it gets objected by any material it gets reflected back toward the sensor this reflected wave is observed by the Ultrasonic receiver module as shown in the picture below. Electric Parameter are Working Voltage DC- 5, Working Current -15mA, Working Frequency -40Hz, Max Range -4m, Min Range- 2cm



Fig.2 – Ultrasonic Sensor

5.2. ATMEGA 16: -

In this project ATMEGA 16 microcontroller is used for control system. It gets information from sensors and process on it and compares the received data with the threshold level set and accordingly output is generated.

5.3. Wi-Fi module: -

ESP8266 is a Wi-Fi module which will give your projects access to Wi-Fi or internet. It is a very cheap device but it will make your projects very powerful. It can communicate with any microcontroller and make the projects wireless. The ESP8266 has 8 pins; the VCC and CH-PD will be connected to the 3.3V to enable the Wi-Fi. for it as it used for implementation.

5.4. Power supply +5v: -

Power supply is required to operate the whole system .it required +5v power supply, it mainly use to provide DC voltage to the components on board and +12 v used for motor.

5.5. Motor for Separator (30 rpm): -

Motor (30 RPM) is used for purpose of Separation of garbage. When garbage is wet or dry according to the situation motor rotated anti-clockwise or clockwise.

5.6. Sensor (garbage sensor): -

Sensor is used for the purpose of sensing of garbage whether it is dry or wet. Motor (30 rpm) is used for purpose of Separation of garbage. When garbage is wet or dry according to the situation motor rotated anti-clockwise or clockwise.

5.7. Conveyor Belt: -

Conveyor belt uses a wide belt and pulleys and is supported by motor. A conveyor belt carrying coins / chocolates. Belt is rotated with endless loop. When garbage throws in the dustbin then coins / chocolates comes out from the dustbin.

5.8. Motor (100 RPM): -

Motor (100 RPM) is used for rotating of conveyor belt.

6. Separation of Wet and Dry Garbage: -

Once the waste materials are collected at on place separation of wet and dry garbage is important recycling and separation of wet and dry garbage has always been challenge of municipal solid waste management and it has become an important issue for governments all over the world. In this session we intend to use motor (30 rpm) for identifying and separating different types of garbage. A conveyer belt carrying coins when garbage throws in the dustbin then coins comes out from bin.

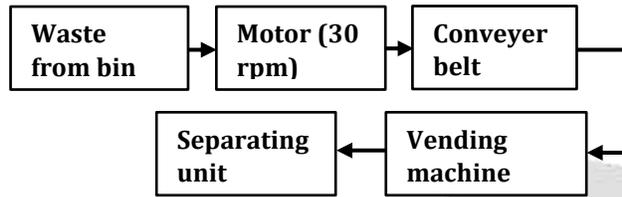


Fig.3 – Separation Module

7. Working: -

This project smart garbage dustbin is a very innovative system which will help to keep the cities clean. This system monitors the garbage bins and informs about the level of garbage collected in the garbage bins. For this the system uses ultrasonic sensors placed over the bins to detect the garbage level and compare it with the garbage bins depth. The working program is fed into the ATMEGA 16. Ultrasonic sensor senses the garbage level and accordingly send the signals to the ATMEGA16. ATMEGA16 process the received signal and passed further to the ESP8266. ESP8266 is a Wi-Fi module (node MCU) which is also working as a transmitter in our system. ESP8266 plays very important role in reducing the hardware of the system. In this way when garbage crosses the threshold level, web page displays the location of that bin by using html. Sensor is used for sensing the garbage whether it is dry or wet. Motor (30 RPM) is used for purpose of Separation of garbage. When garbage is wet or dry according to the situation motor rotated anti-clockwise or clockwise.

Conveyor belt uses a wide belt and pulleys and is supported by motor. A conveyor belt carrying coins / chocolates. Belt is rotated with endless loop. When garbage throws in the dustbin then coins / chocolates comes out from the dustbin. Motor (100 RPM) is used for rotating of conveyor belt.

8. Flow chart: -

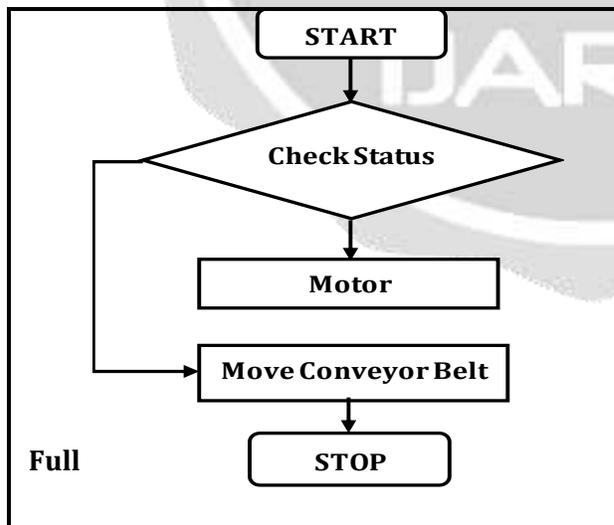


Fig.4 – Flow Chart

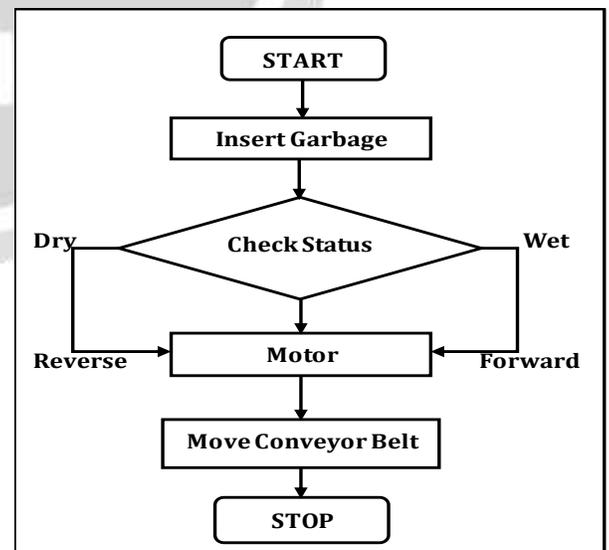


Fig.5 – Flow Chart

9. Reference: -

- 1) Design a Smart Waste Bin for Smart Waste Management, 2017 5th International Conference on Instrumentation, Control, and Automation (ICA) Yogyakarta, Indonesia, August 9-11, 2017 By Aksan Surya Wijaya, Zahir Zainuddin.
- 2) IOT Based Smart Garbage alert system using Arduino UNO, By Dr.N.Sathish Kumar, B.Vijayalakshmi, R. Jenifer Prarthana, A .Shankar 2016 IEEE Region 10 Conference (TENCON) — Proceedings of the International Conference.
- 3) International Journal of Advanced Research in Computer and Communication Engineering ISO 3297:2007 Certified Vol. 7, Issue 4, April 2018 Copyright to IJARCCCE DOI 10.17148/IJARCCCE.2018.7434 177 GSM based Garbage Monitoring System S.Kale, P.Alane, K. Gaikwad
- 4) Navghane S S, Killedar M S and Rohokale D V 2016 IoT Based Smart Garbage and Waste Collection Bin International Journal of Advanced Research in Electronics and Communication Engineering (IJARECE) 5 1576-78
- 5) IJSRD - International Journal for Scientific Research & Development| Vol. 5, Issue 01, 2017 | ISSN (online): 2321-0613 IoT Based Garbage Monitoring System. Puspendra Singh, Ram Bilas Nagar, Ranjeet Kumar Raman, Rishikesh Kumar Gupta,Rupal Gupta
- 6) Wastage monitoring system using IOT International Journal of Pure and Applied Mathematics Volume 119 No. 15 2018, 2705-2712, SWARNA M , K J ANOOP , K KANCHANA ,Chennai, India.

