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AUTOMATIC TRASH CAN BUGGY WITH IOT

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ABSTRACT - *The world today faces major garbage crisis- the product of rapid economic growth, overcrowding, poor urban planning, corrosive corruption and political dysfunction. And the world is looking at smarter ways of overcoming the garbage collection problem. Present way of collecting the garbage leads to various issues both for public and garbage collectors. Improper disposal of waste is the main cause for health related problems. Soil, water and air pollution can all be a result of improper waste disposal and occurs when either of them becomes contaminated with hazardous materials. Not only does this contribute to the creation of a greenhouse gas effects but also causes significant harm to marine and wildlife.*

This report presents the design and the experimental results of the Garbage Collector vehicle for foot path using Arduino microcontroller in the smart cities. The movement of the robot is controlled with the help of infrared sensor for the purpose of locomotion without any public interruption and guiding the bot in predefined path and RFID to identify each home. The buggy will move in a predefined path with the help of IR sensor. If interruption is encountered by the ultrasonic sensor or the RFID the bot will stop and the garbage is collected. Ultasonic sensor is meant for the passer by and RFID is meant for home recognition. Also this buggy can be used to collect Garbage at foot path, public places (parks, schools and colleges), mostly cemented paths and beach.

Key Words: **RFID, Transreceiver, NodeMCU, Wireless Transmisson, Automation, Sensors, etc**

1. INTRODUCTION

Now a days, the arena has become a very busy location. That is especially due to the speedy increase in population as well as physical resources. Together with these factors, there may be every other aspect which has, in flip, increased at an alarmingly high rate, which is the amount of rubbish being disposed. As anyone one would expect, this has grow to be one of the main issues that the whole world, has come to face nowadays. This dilemma is not confined to the cities and towns, but even in small villages, the collecting and putting off garbage has become quite a headache for the network. With admire to human health and hygiene, in addition to the cleanliness of the environment, the effectiveness of rubbish disposal is very important. Although the maximum common ways of disposing rubbish are bins and baggage, both those methods are carried out manually, Which means that garbage disposal becomes a enormously time-ingesting and hard process, and places inclusive of colleges, eating places, hotels, offices, manufacturing flowers are adversely affected. To overcome this feasible disaster, an automatic gadget, applied with using electronics, added in such locations, might prove to be noticeably efficient. it might get the activity finished without1 difficulty, with minimal labour and risks to fitness, as well as time and cash being saved in the process. This idea turned into the base background for us to undertake this assignment. The concept of easing the challenge of collecting and disposing rubbish changed into distinctly motivating, because we, as university college students, are very plenty familiar with this unpleasant job. So this is wherein the foundation of our venture become laid.

2. AIM AND OBJECTIVES

Studying the problem of garbage disposal at a school, restaurant, officeThe primary aim for doing our project was to introduce a way in which garbage could be collected and disposed in an efficient and effective manner. To achieve this, the following objectives have to be completed.

- Home, Hotel, Production plant or any other suitable location
- Develop a solution to that problem
- Studying the technologies that can solve the problem
- Designing and developing a system for solving the problem
- Testing and maintaining the implemented system

This system, though primarily intended for the benefit of school children, can be used and implemented by various other types of individuals as well. For example, in a hospital, library, cafetaria, working office, hotel, restaurant, production plant or any other public place where the disposal of garbage occurs on a daily basis, this system can be used by the people frequenting such places, to effectively dispose garbage. Inputs are Signals from the IR sensors, Signals from radio transmission, Signal from the ultrasonic sensor to find human interruption, Signal from the ultrasonic sensor to indicate whether the dustbin is full, through NODE MCU. outputs are Receives garbage

from garbage containers Sounds an alarm to indicate the presence of dustbin, The garbage collector travels along the pre-defined path Signal for the servo to open the dustbin, Output to the mobile to indicate that dustbin is full.

3. PROCESS

This type of garbage collection process follows certain principle to collect the waste material in the smart city. The whole process is to automate the difficulties involved in collecting waste from every houses. The path is black in colour, which is sensed by the IR sensors. The trash buggy follows the black line. Ultrasonic sensor which is placed at the front of the buggy senses if any human intervention is there, stop for a while and rotates the servo to open the trash can. Active RF ID is placed at outside of every wall. If the processor detect the RF ID, the buggy stops in the particular place to collect the trash. When RF ID is detected, buggy communicates with the dustbin where the wastes of the particular home is placed through NRF24L01.Receiver NRF24L10 receives the signal and actuate the servo so that waste from the dustbin will fall into the buggy.

TECHNOLOGY

- Arduino micro-controller technology
- DC gearhead motor technology
- Radio frequency technology
- IR (Infra-Red) technology
- Actuators

FEATURES

- The system is fully automated
- Does not require a large space to operate
- Ability to start up the system remotely
- Prevent from overflow of waste from dustbin

4. DESIGN

Garbage Collector:

Then we are going to program the garbage collector to go to each house on pre-defined black path. When it reaches a garbage container, it will receive garbage from the garbage container. When the garbage bin is full it will automatically go to the waste dump.

NodeMCU:

NodeMCU is a open source IoT platform. It includes firmware which runs on the ESP8266 Wi-FiSoC from Espress if Systems, and hardware which is based on the ESP-12 module. It is a single-board microcontroller and XTOS is the working operating system.ESP8266 is the processor used in the node mcu. It contain 128 kbytes of internal memory on board. It stores about 4 Mbytes.

IR Sensors:

In this system, IR sensors are used for several purposes. Since IR rays are absorbed by black surfaces, it can be used to choose between black and other surfaces. We are using IR sensors that take 2 different inputs into the system.

Detect the path of the black line, which marks the route of the garbage Collector, to detect the black line and to determine the route and where to stop, an array of two sensors are used.

Actuators Lid/Door:

Actuators or servomotor are used to open and close the doors and lids of both the Garbage Container and the Garbage Collector.

Buzzer:

This unit will be once activated if it senses the RFID at particular location. It gives alarm sound to indicate that trash buggy is available outside, so that garbage can be collected from each home.

Motor Left/Right:

We are using DC motors to move the garbage collector around the selected environment, which is a school in this case. Since normal DC motors have very high rpm, and can only handle a little amount of torque, 90 RPM, DC geared motors are used.

Motor Controller:

We cannot directly connect the motors into the micro-controller, because there are situations where we have to control the speed of the motors, such as when the garbage collector is turned. We are using the PWM (Pulse Width Modulation) method to control the voltage given to the motors.

Garbage Level Checker:

The garbage level is checked by an ultrasonic sensor, which is positioned inline, and on the correct level inside the Garbage Collector. When the garbage is over a certain limit, it obstructs the sound waves, which is pointed at the sensor. This determines the Garbage Collector to stop the current process, proceed directly to the dumpsite and to return and continue the process from where it last stopped.

Microcontroller:

This is the main part of the whole system. We are using the Atmel 8-bit AVR chip as the micro controller. It is the brain, as well as the heart of the system. It takes all the inputs of the system and then performs the logic operations and arithmetic operations. Then it outputs necessary signals to the output modules. Therefore, this chip is like a smaller, simpler version of a computer CPU.

Actuator Door:

The same type of actuators are used in here as it is in the Garbage Collector. This actuator opens the door to a side of the Garbage Container. When the door is opened, the weight of the garbage and the slope inside forces the container to empty itself.

Ultrasonic sensor:

The ultrasonic sensor is to detect the whether the dustbin is full, and also to find out the human intervention in the path, the trash follows.

Radio Receiver:

This unit receives signals from the radio transmitter, which is connected to the garbage collector. A signal decoder

5. AUTOMATION OF GARBAGE DISPOSAL

The Automated Garbage Collector is a simple solution to overcome the difficulty of collecting garbage in a places such as offices, hotels, production plants, hospitals and specially schools, where it is required to walk from place to place to collect garbage. In this chapter, the way in which the hardware and software has been assembled into one single system is described, and a solution is offered.

6. OUR SOLUTION TO SOLVE THE PROBLEM

In this model, our way of collecting garbage from each and every home is entirely different which is only applicable for smart city purpose. Now a days garbage collectors are facing huge problem in the process of collecting garbage. By automating the purpose of collection of garbage one can achieve clean environment. Our buggy gets its multiple input from IR sensor, RF Id which are placed at different location, and output are given to motors, actuators and the buzzer.

Here, we designed with the help of Internet of things to find out the overflow of garbage, by help of IOT, messages will be immediately sent to the municipality for further action.

Once the system is initiated with remote controlled unit, trash buggy starts its work of collecting garbage from each house following predefined path(following the black line) .It is guided to each location not only by following the line which is defined but also by means of active RF ID. For the purpose of prototype we used passive RF ID here, Active RF ID has long range and gives accurate locomotion. RF ID and IR sensor are feedback to each other to correct the error in the line following

Each and every home in the path are identified by the RF Id fixed to the wall of the particular house. Once RF reader fixed in the buggy finds the particular rf id, buggy stops in the particular location and gives alarm sound, Wait for 10 sec in that location.

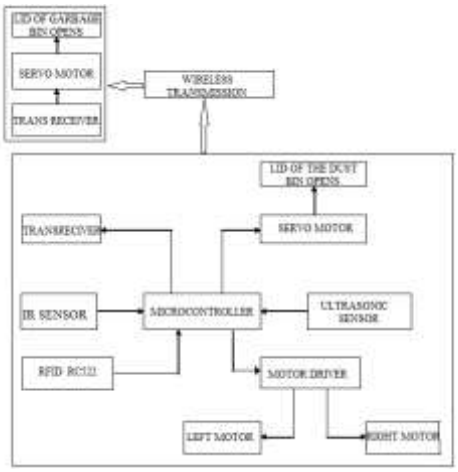
Wastes of particular house has to be placed in the dustbin which is placed at outside of each house. By means of NRF 24L01 Transreceiver, trash buggy which moves across each home communicate to the dustbin at the respective location and actuate the servo so that trash can be easily collected to the trash buggy without any human intervention. It continues the same process until the trash buggy is full

Filled trash buggy can be identified by ultrasonic sensor fixed to the trash buggy, if the ultrasonic sensor senses the trashRfis used to decode the signal into 4 bits. Then it is fed into the micro controller chip. Then it triggers the door opening mechanism.

Id in the particular street, send a message to the near by main can is full, It will not recognize any of the garbage collector and reside at the end of the particular street.

If some human intervention is find in front of the buggy path, it will stop for while also open the trash can so that person can place the waste material.

7. BLOCK DIAGRAM



8. BENEFITS

1. Human interaction is not necessary.
2. Spreading of diseases can be minimized.
3. Since the trashcan is monitored regularly overflowing is not possible.

9. CONCLUSION

All these old systems have dealt with carrying out collected garbage for disposal. In our implementation, we focus on both the collection and disposal of garbage. This automated system facilitates an easier and smarter way of dumping garbage. It is capable of automatically moving as directed, and allows garbage to be disposed more easily. This also helps to save time. It can be sent to collect garbage whenever we need, and the garbage can then be disposed of in the correct place in the correct manner. This helps to get rid of many issues that occur with the disposal of garbage.

10. REFERENCE

1) Prof. R.M.Sahu, AkshayGodase, Pramod Shinde, Reshma Shinde, "Garbage and Street Light Monitoring System Using Internet of Things" INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH IN ELECTRICAL, ELECTRONICS, INSTRUMENTATION AND CONTROL ENGINEERING, ISSN (Online) 2321 – 2004, Vol. 4, Issue 4, April 2016.

2) KanchanMahajan, Prof.J.S.Chitode, "Waste Bin Monitoring System Using Integrated Technologies", International Journal of Innovative Research in Science, Engineering and Technology (An ISO 3297: 2007 Certified Organization) Vol. 3, Issue 7, July 2014.

3) Navghane S S, Killedar M S and Rohokale D V 2016 IoT Based Smart Garbage and waste collection, International Journal of Advanced Research in Electronics And Communication.

4) Monika K A, Rao N, Prapulla S B and Shobha G 2016 Smart Dustbin-An EfficientGarbage Monitoring System International Journal of Engineering Science andComputing 6 7113-16.