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Solid waste management system by IoT

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ABSTRACT

Internet of Things is constantly evolving and is giving unique solutions to the everyday difficulties faced by man. "Smart City" is one such usage went for enhancing the life style of people. The real obstacles faced in many areas is its solid waste management, and successful administration of the strong waste created turns into an indispensable piece of a brilliant city. This paper goes for giving an IoT based building answer for handle the issues looked by the present strong waste administration framework. By giving an entire IoT based framework, it consists of following, gathering, and dealing with the strong waste can be effectively mechanized and checked productively. By taking the problem of the strong waste management emergency of Bengaluru city, India, we have thought the general framework design and convention stack to give an IoT standard solution for providing quality and productivity of the framework. By making utilization of sensors, we gather information from the junk receptacles and that information is sent to Blynk servers. The information from different junk containers is gathered by send to Blynk servers through the internet.

Keywords: IoT, ESP8266, WIFI.

1. INTRODUCTION

With reliably cruising by, we see various new headways rising, which intend to help humanity. The Internet of Things or IoT for short, is an arrangement of web related articles (or things) that can accumulate and exchange data. It is said that "Web of things is an invention which machines talks each other with less human communication" is the mix of the embedded, framework, and information propels; and the essential factor that is driving IoT is the exceptional abatement in the cost of sensors, dealing with power and exchange speed(broadband), and increase in inescapable remote degree. Kevin Ashton (who is the "father of the IoT") assumed that IoT could change the world into data which could be used to settle on full scale decisions on resource use and administration. IoT crosses over different regions, and strong waste administration is one such zone which is a fundamental bit of a keen city establishment. Junk age has transformed into a bit of every one's life, and going by this, the city of Bengaluru produces a check of 5,000tons of wastage each day. There are numerous deterrents looked by the city area in social event the trash, transporting it, and managing the entire system. Solid waste administration fuses gathering, storage, segregation, transportation, and reusing of the squander made. Starting at now the waste isn't confined, and the assembled squander is dumped straight forwardly in dump yards causing inconsequential augmentation in the measure of garbage.. The essential issue in strong waste administration framework is separation of the reject and assembling it from the tidy receptacles. Using the data assembled from the clean containers with a couple of information examination, and GPS (Worldwide Situating Framework) advancement, the landfill trucks can be composed to only those tidy canisters that ought to be cleared and besides be given viable courses using a versatile application to ensure honest to goodness junk collection happens and the trucks don't dawdle by heading off to the tidy receptacles which are filled. Using the information accumulated from the entire system, information mining and information examination ought to be conceivable to comprehend the measure of wastage assembled, the thickness of waste, the thickness of garbage accumulated with respect to the locale, et cetera and a honest to goodness administration structure can be set up. By consolidating IoT into the structure,

gathering, transportation, vitality age (from reused misuse), et cetera of the waste can be checked beneficially and exact quantifiable models can be made to ensure fitting strong waste management.

2. STATEMENT OF PURPOSE

The wastage would then swing to cash. The data on measure of waste gathered and isolated by the accommodating waste specialists has not been shared to the general people, and nor the association has its record. Suitably they are mistreated and their part is incredibly undermined paying little mind to how they are genuinely cleaning our urban gatherings for us. The fundamental issue caused by city solid waste is on general flourishing and the earth. In like insightful, air and water contamination are in like way the results of contemptible organization of wastage that has exacerbated air, drinking water and sanitation. The separating of ordinary waste in landfills makes a gas which is made on an exceptionally fundamental level out of methane, an ozone-depleting substance adding to natural change. Recollecting a definitive target to consider carbon surge sources, The Civil Relationship of Nepal (MuAN) and the Worldwide Chamber for Nearby Natural Activities (ICLEI) had composed an examination on Kathmandu Metropolitan City and Lalitpur and Pokhara Sub-metropolitan Urban society in June 2009. According to the examination, the rule wellsprings of carbon radiation in these three regions were transport (31%), mechanical (27%), private (22%), business (11%) and others (9%)

3. RELATED WORK

Strong squander organization can be comprehensively asked for as: separation, amassing, and transportation. The proposed structure outlining for our solid Waste organization framework. Separation of the solid waste should be possible at the root level where local people detach the hardship as appeared by wet (biodegradable), plastic, paper, glass, and unsafe waste and dump the garbage to the particular deny holders put at different areas. The canisters will be fitted with IR sensors to see the level of decline gathered. Measure the extensiveness of the compartment, and pointers like LEDs and LCD will be used for watches. The sensors and actuators will be interfaced to a microcontroller that will amass the sensor information and send it to an entrance utilizing SigFox handset module. A portal module with a SigFox handset will be utilized to get the sensor information from two or three garbage canisters

4. METHODOLOGY

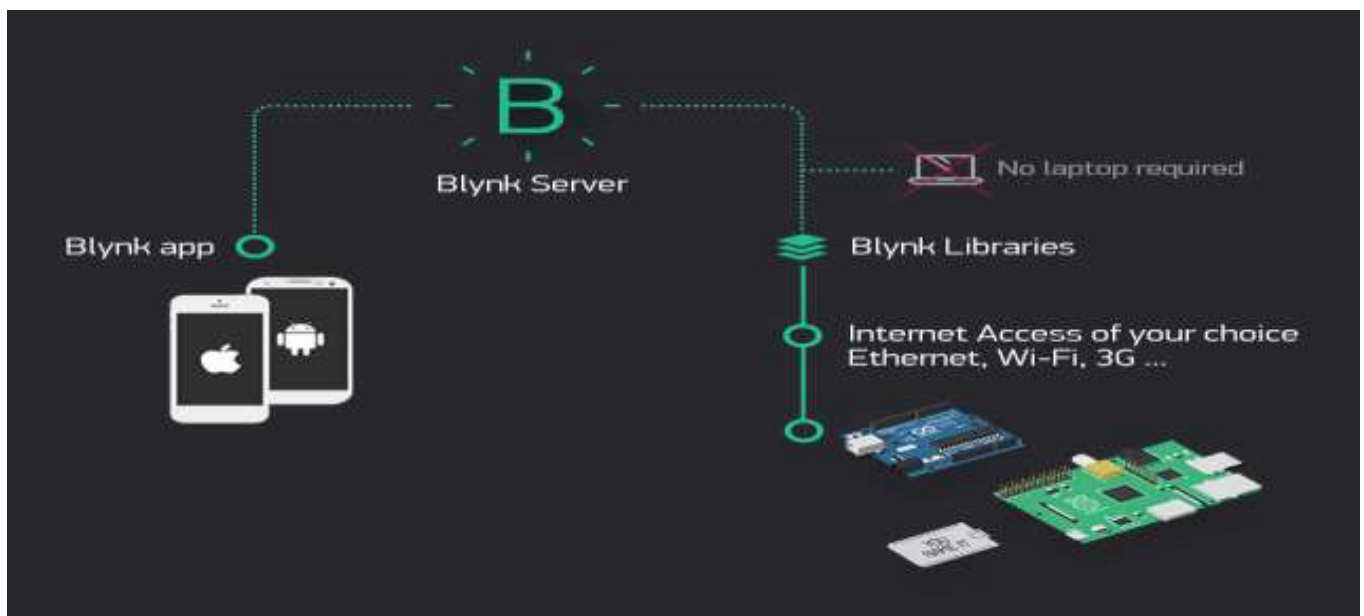


Fig 1.1: blynk connectivity with sensors

Blynk is a Platform with iOS and Android applications to control Arduino, Raspberry Pi and the preferences over the Internet.

It's an advanced dashboard where you can manufacture a realistic interface for your task by essentially moving gadgets.

It's extremely easy to set everything up and you'll begin tinkering in under 5 mins.

Blynk isn't attached to some particular board or shield. Rather, it's supporting equipment of your decision. Regardless of whether your Arduino or Raspberry Pi is connected to the Internet over Wi-Fi, Ethernet or this new ESP8266 chip, Blynk will prepare you on the web and for the Internet Of Your Things.

4.1 HARDWARE

ESP8266



Fig-4.1 ESP8266

ESP8266 offers a total and independent Wi-Fi organizing arrangement, enabling it to either have the application or to offload all Wi-Fi organizing capacities from another application processor. When ESP8266 has the application, and when it is the main application processor in the gadget, it can boot up specifically from an outside glimmer. It has incorporated reserve to enhance the execution of the framework in such applications and to limit the memory requirements. Alternately, filling in as a Wi-Fi connector, remote web access can be added to any microcontroller-based outline with the basic network through UART interface or the CPU AHB connect interface. ESP8266 on-load up preparing and capacity abilities enable it to be coordinated with the sensors and other application particular gadgets through its GPIOs with insignificant advancement in advance and negligible stacking amid runtime. With its high level of the on-chip mix, which incorporates the receiving wire switch balun, control administration converters, it requires negligible outside hardware, and the whole arrangement, including front-end module, is intended to involve insignificant PCB zone.

Ultrasonic Sensor



Fig:-4.2 UltraSonic Sensor

An Ultrasonic sensor is a contraption that can check the detachment to an inquiry by using sound waves. It apportions evacuate by sending a sound wave at a specific repeat and tuning in for that sound wave to ricochet back. By recording the snuck past time between the sound wave being created and the sound wave weaving back, it is possible to learn the division between the sonar sensor and the inquiry.

$$\text{Distance} = (\text{speed of sound} \times \text{time taken}) / 2$$

Since it is understood that sound experiences air at around 344 m/s (1129 ft/s), you can set aside the perfect open door for the sound wave to return and increment it by 344 meters (or 1129 feet) to find the total round-trip partition of the sound wave. Round-trip suggests that the sound wave voyaged 2 times the division to the challenge before it was recognized by the sensor.

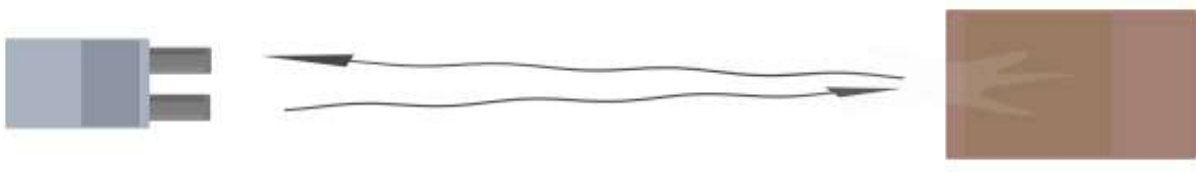


Fig4.3: Ultrasonic sensor working

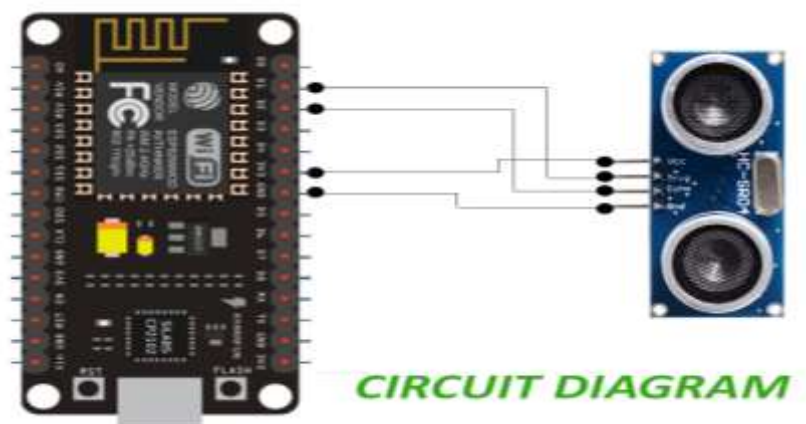
Jumper Wires

A jumper wire (otherwise called jumper, jumper wire, jumper link, DuPont wire, or DuPont link - named for one maker of them) is an electrical wire, or gathering of them in a link, with a connector or stick at each end (or at times without them - essentially "tinned"), which is ordinarily used to interconnect the parts of



Fig-4.4 Jumper Wires

5. BLOCK DIAGRAM



The sensor Vcc is connected to the NodeMCU +3.3v.

The sensor GND is connected to the NodeMCU GND.

The sensor Trigger Pin is connected to the NodeMCU Digital I/O D4.

The sensor Echo Pin is connected to the NodeMCU Digital I/O D3.

We can determine the distance because we know how long it took for the sound waves to travel out from and back to the module (by how long the echo pin was HIGH) and we know the speed of sound in the air. But I am not getting into that. We're going to let NodeMCU figure out that stuff.

Look at the distance in the serial monitor of the object placed in front of the sensor, the sensor gives an accurate measurement range from 2 - 400cm.

6. PROJECT OUTLOOK

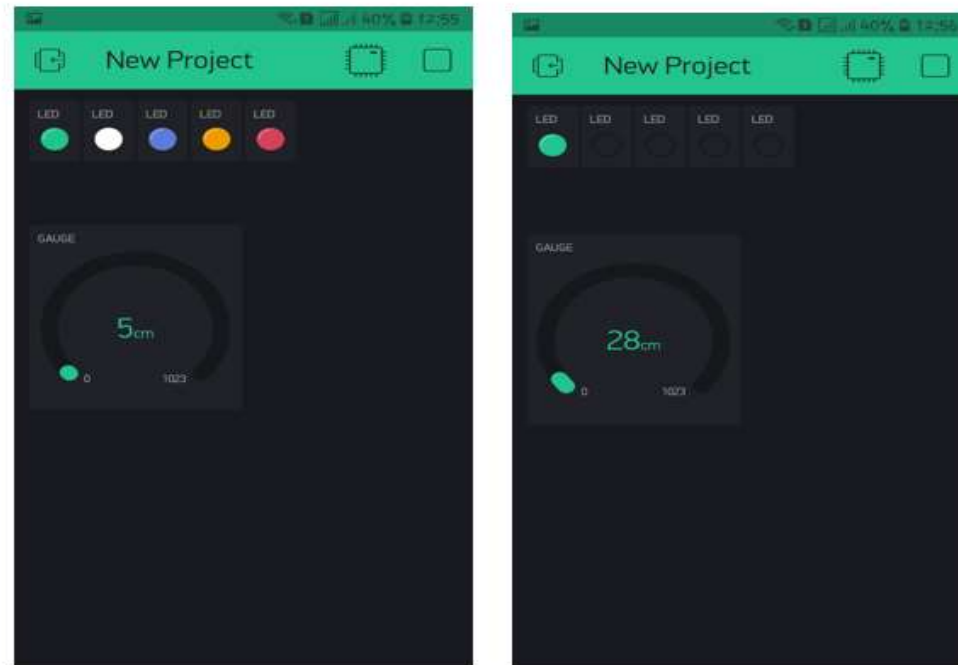


The circuit has been fitted in a dustbin. an extra component IR sensor has been used in the module that the functionality of the IR Module is that when a person comes near to in a range of <15 cm it going to produce a sound from a buzzer.

The need of buzzer is to show that an active 5v supply has been passing/working with the IR sensor.in place of buzzer, we can place a dc motor which automatically lifts the top of the bin and another accessories.

The data from the bin ESP8266 is going to be displayed in Blynk app An UI for hardware to the user.

7. RESULTS



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