

Boodskap IoT Contest

Smart Garbage Monitoring System Using Internet of Things (IOT)

Problem Statement and Proposed Solution:

Anyone who keeps track of how many material items they toss in the garbage can on a daily basis is somewhat aware of how much waste they **generate. This isn't a fun activity to engage in, and let's face it**—other than the supremely environmentally conscious—most people do not measure their waste, nor do they manage it. In India, this is propagating a garbage crisis, which is the cause of a number of environmental problems and **public health issues. India's rapid economic growth has resulted in a** substantial increase in solid waste generation in urban centres. Urban areas in India alone generate more than 100,000 metric tonnes of solid waste per day, which is higher than many countries' total daily waste generation.



We are living in an age where tasks and systems are fusing together with the power of IOT to have a more efficient system of working and to execute jobs quickly! With all the power at our finger tips this is what we have come up with.

The Internet of Things (IoT) shall be able to incorporate transparently and seamlessly a large number of different systems, while providing data for millions of people to use and capitalize. Building a general architecture for the IoT is hence a very complex task, mainly because of the extremely large variety of devices, link layer technologies, and services that may be involved in such a system.

One of the main concerns with our environment has been solid waste management which impacts the health and environment of our society. The detection, monitoring and management of wastes is one of the primary problems of the present era. The traditional way of manually monitoring the wastes in waste bins is a cumbersome process and utilizes more human effort, time and cost which can easily be avoided with our present technologies.

This is our solution, a method in which waste management is automated. This is our IoT based Garbage Monitoring system, an innovative way that will help to keep the cities clean and healthy.

Overview of the Monitoring System

The idea struck us when we observed that the garbage truck use to go around the town to collect solid waste twice a day. Although this system was thorough it was very inefficient. For example let's say street A is a busy street and we see that the garbage fills up really fast whereas maybe street B even after two days the bin isn't even half full. This example is something that actually happens thus it lead us to the "Eureka" moment!



What our system does is it gives a real time indicator of the garbage level in a trashcan at any given time. Using that data we can then optimize waste collection routes and ultimately reduce fuel consumption. It allows trash collectors to plan their daily/weekly pick up schedule.

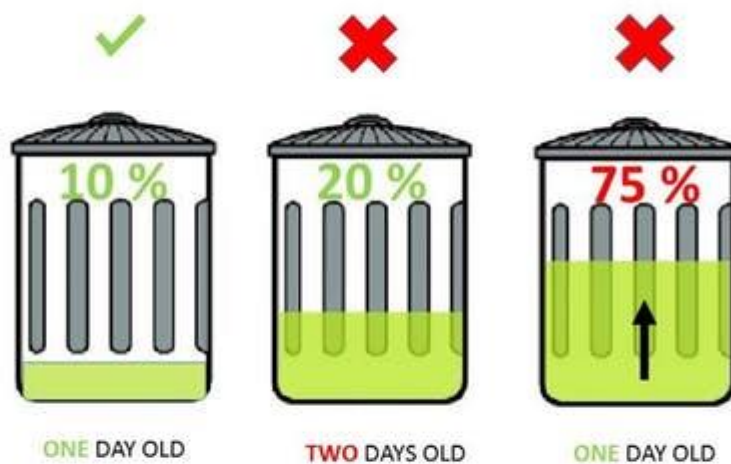


Criteria

The basic Model works like this:

To start with you will first have to enter the height of the dustbin. This will help us generate the percentage of trash in the trashcan. We then have two criterias which needs to be satisfied to show that the particular bin needs to be emptied :

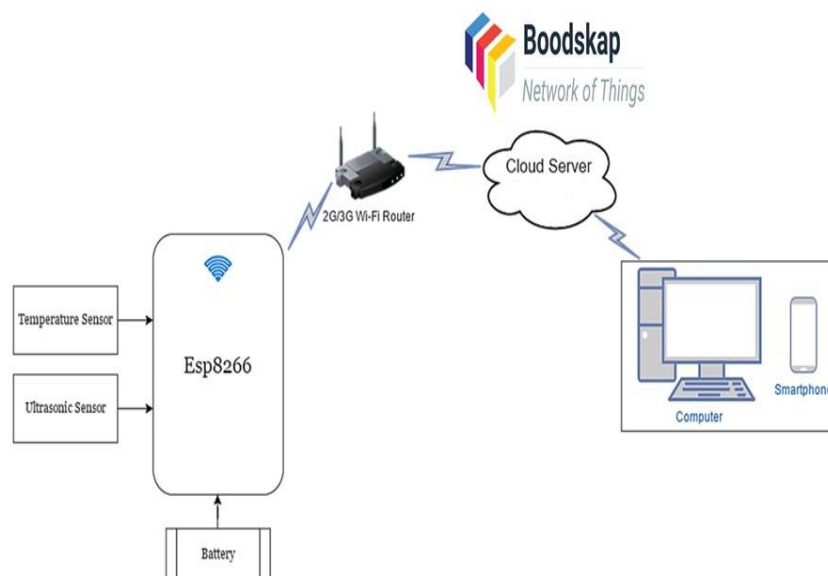
- The amount of trash, in other words let's say if your bin is half full you don't really need to empty it. Our thresh, or maximum amount that we permit of trash, is 75% of the bin. (You could alter the thresh according to your preference.)
- If supposing a particular trashcan fills up 20% and then for a week doesn't change, it comes into our second criteria, time. With time even the little amount will start rotting leading to a smelly surrounding. To avoid that our tolerance level is 2 days, so if a trashcan is less than 75% but it is two days old it then will also need to be emptied.



WORKING OF THE PROJECT:

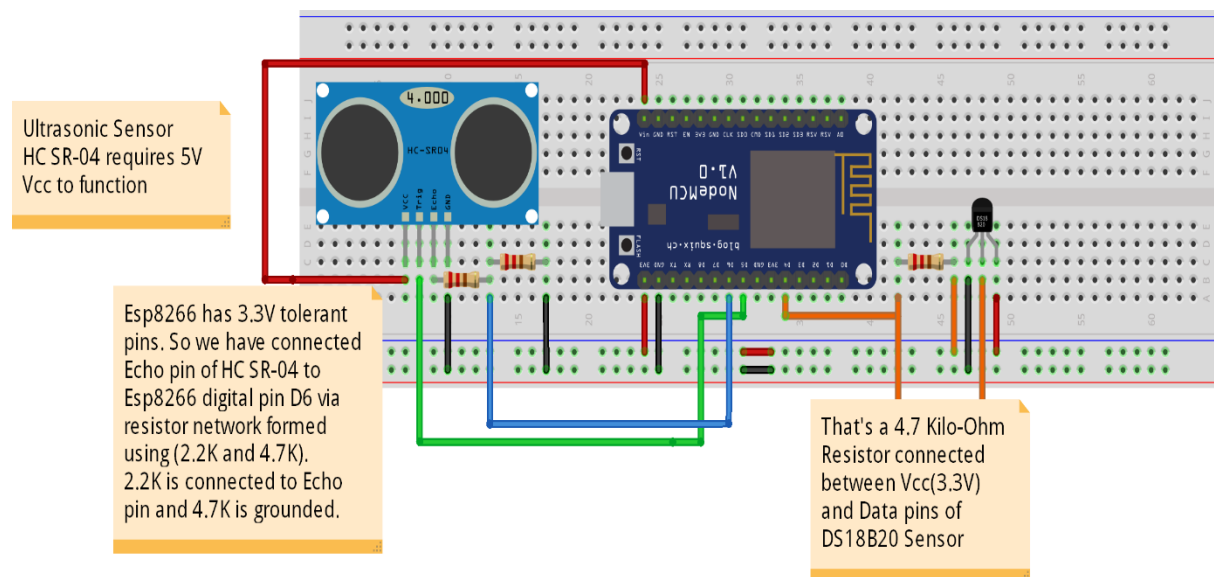
My project aims to optimize waste collection and ultimately reduce fuel consumption. This project will be useful where Wi-Fi hotspots are readily available like hotels and shopping malls, restaurants, coffee shops, and retail outlet, college/institution premises, airports, railway stations, etc. This will help to route optimization which will reduce the number of trips of the garbage trucks hence less traffic will be generated and less pollutant emissions will be released into the air. Also it will help to keep those places free of overflowing garbage containers and this will have a positive impact on tourism.

BLOCK DIAGRAM



The project consists of a Wi-Fi based sensors installed in the container lid. Each device will have a unique ID so as to know to which area the container belongs. The sensor measures the container filling level using ultrasonic technology, temperature using temperature sensor and periodically transmits all captured

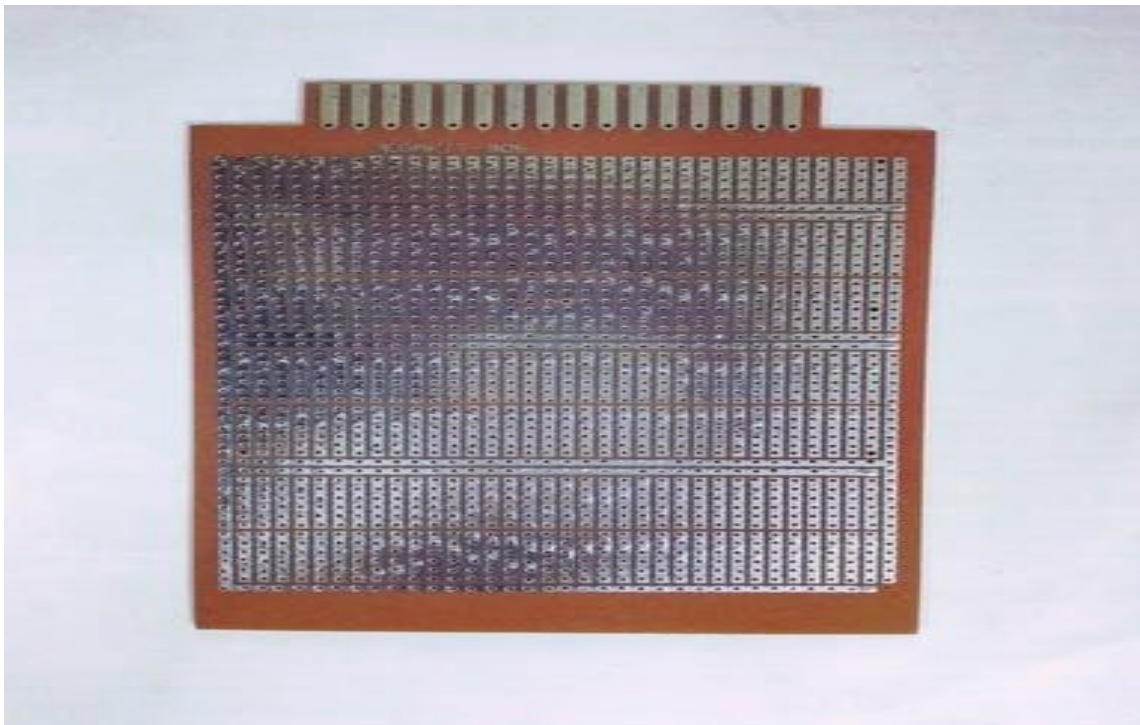
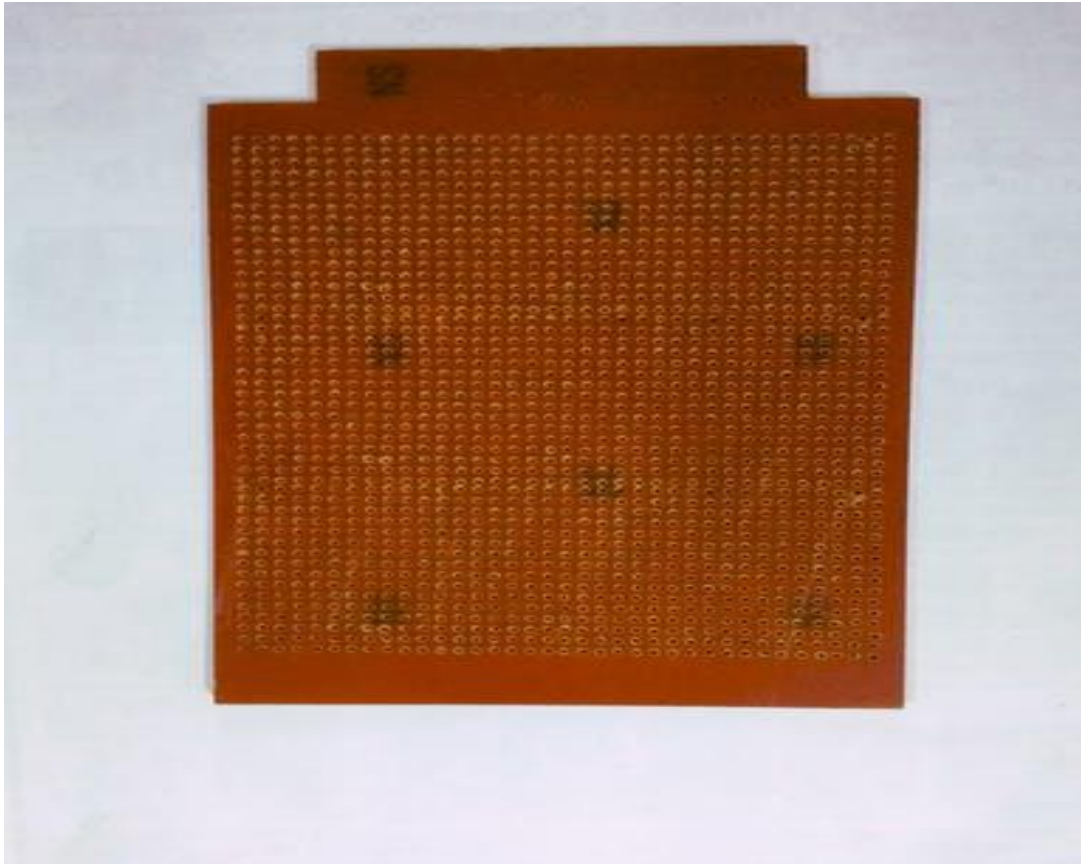
information to the Boodschap. The device can “talk” to the waste management company and thus can tell them whether the container is at full capacity, when it needs to be emptied, what temperature the container is at, and more, allowing the sanitation specialists to work more efficiently and cut unnecessary costs. Additionally, the sensors can help the company forecast when a dumpster will be full, allowing them to plan ahead future routes.

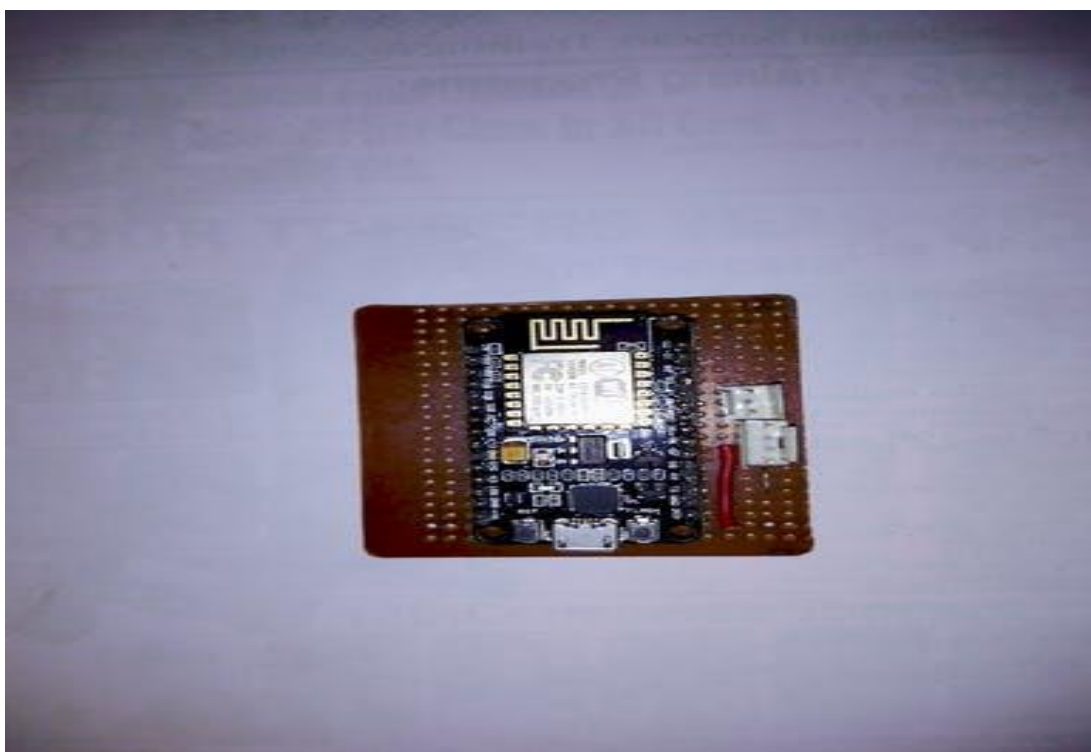


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Sensor Connection Diagram

PROJECT IMAGES:

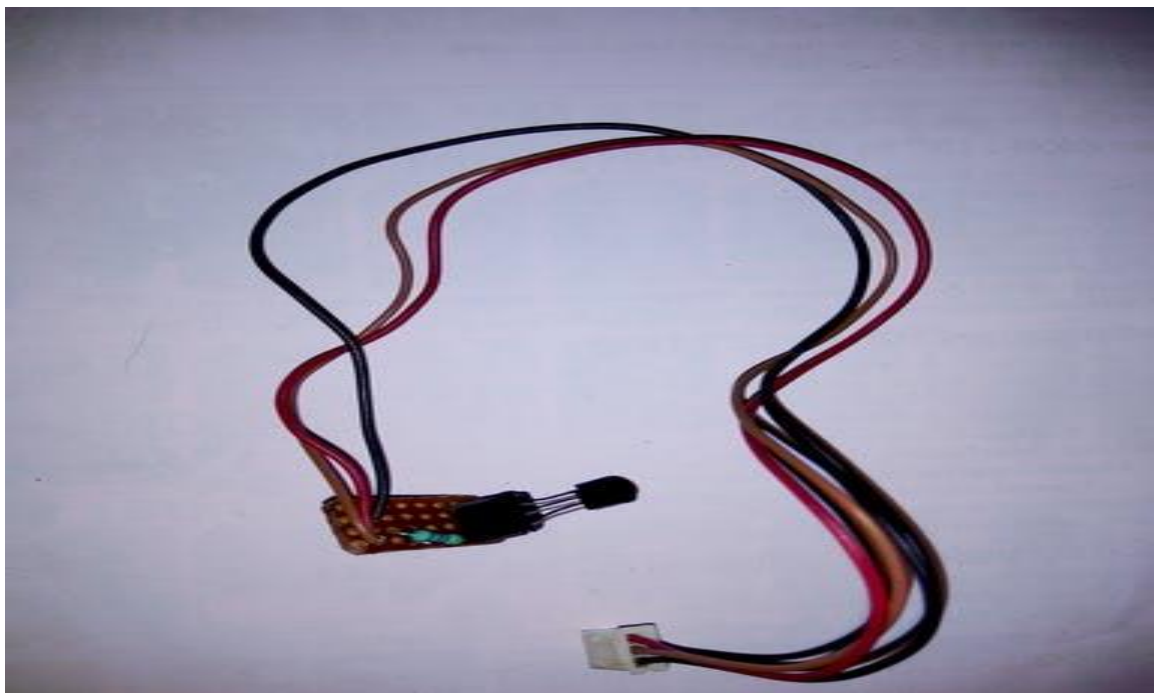
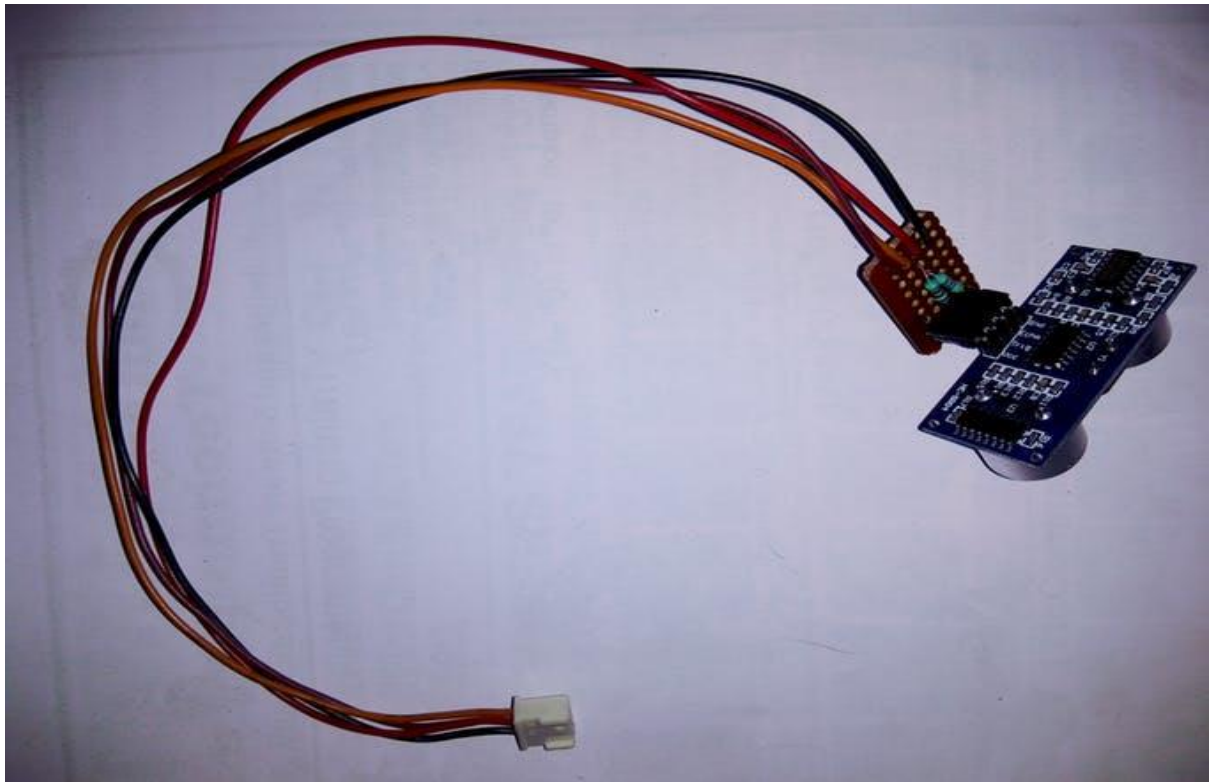


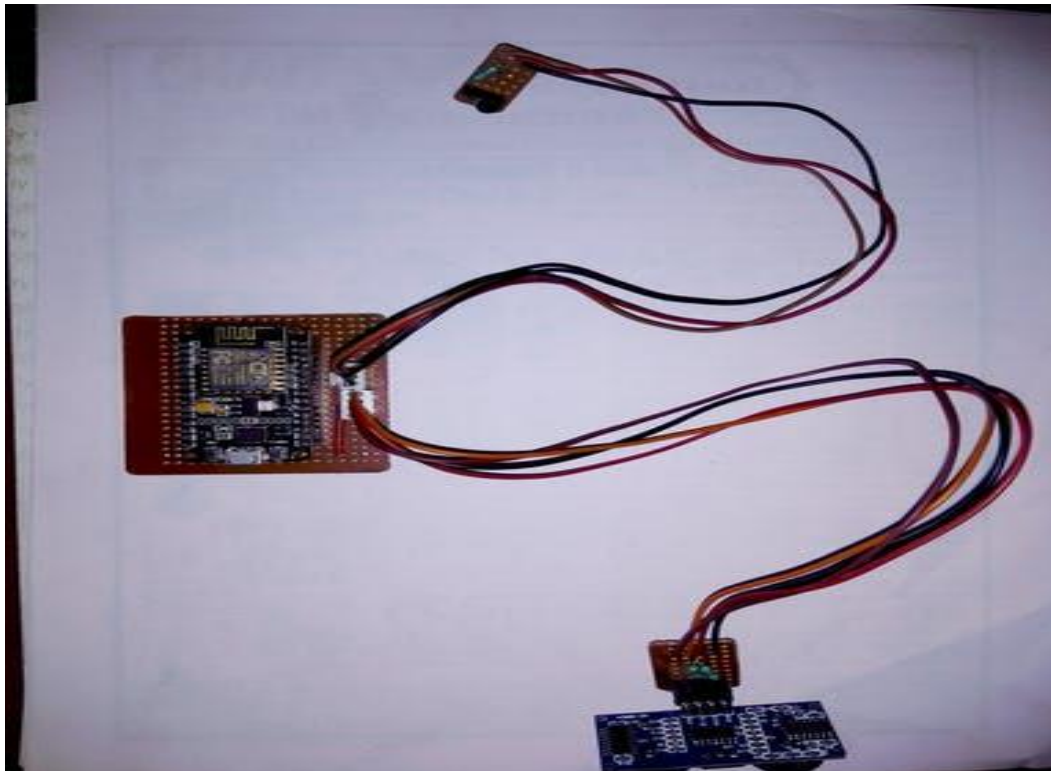




Ultrasonic Sensor



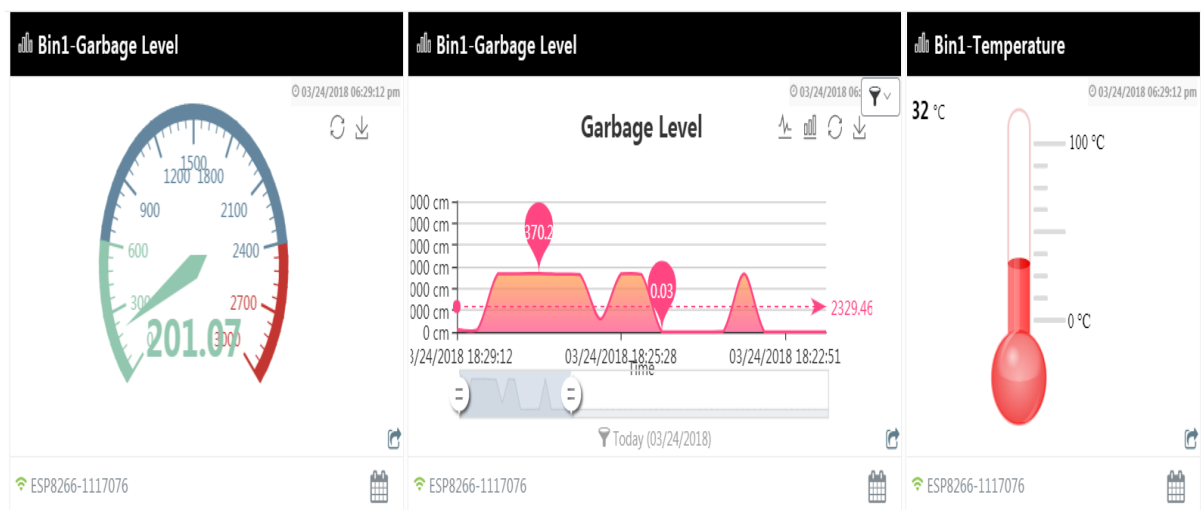


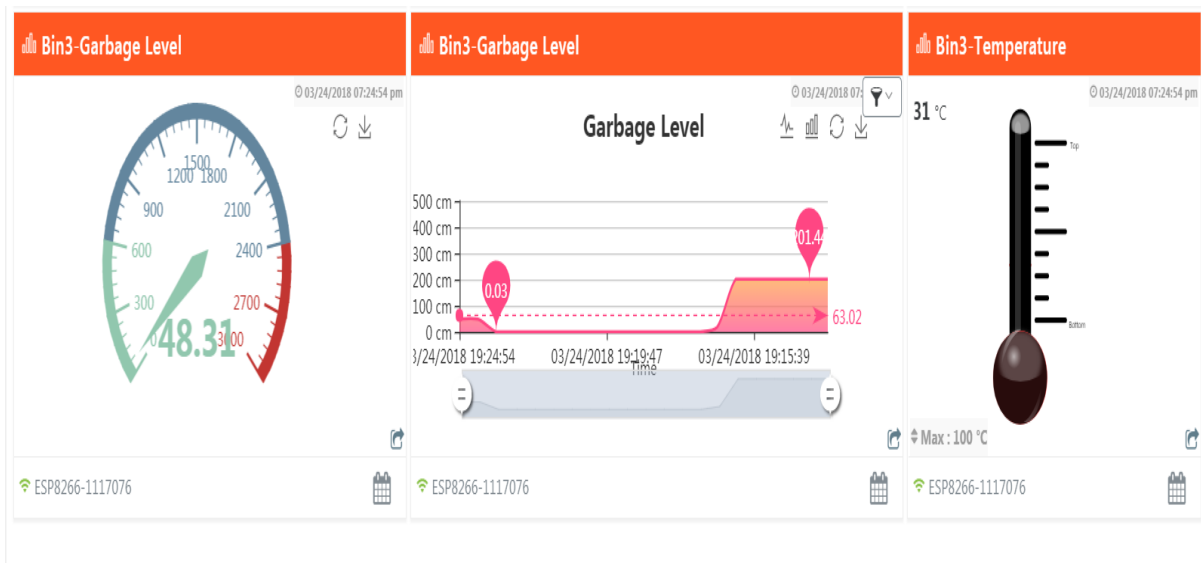
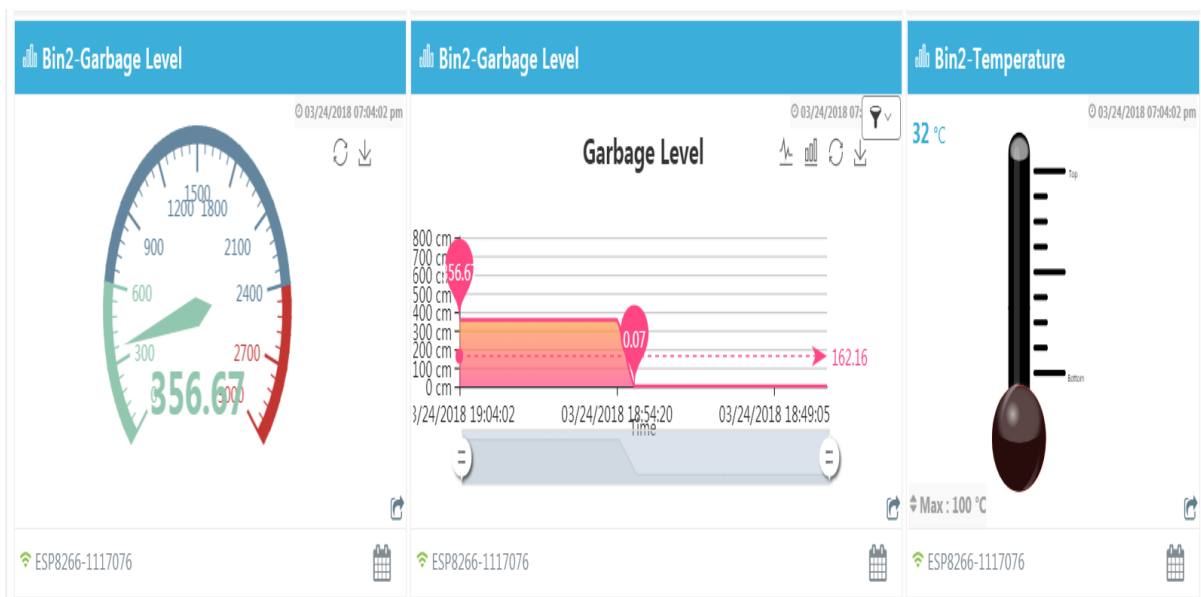


Sensors interfacing with NodeMCU

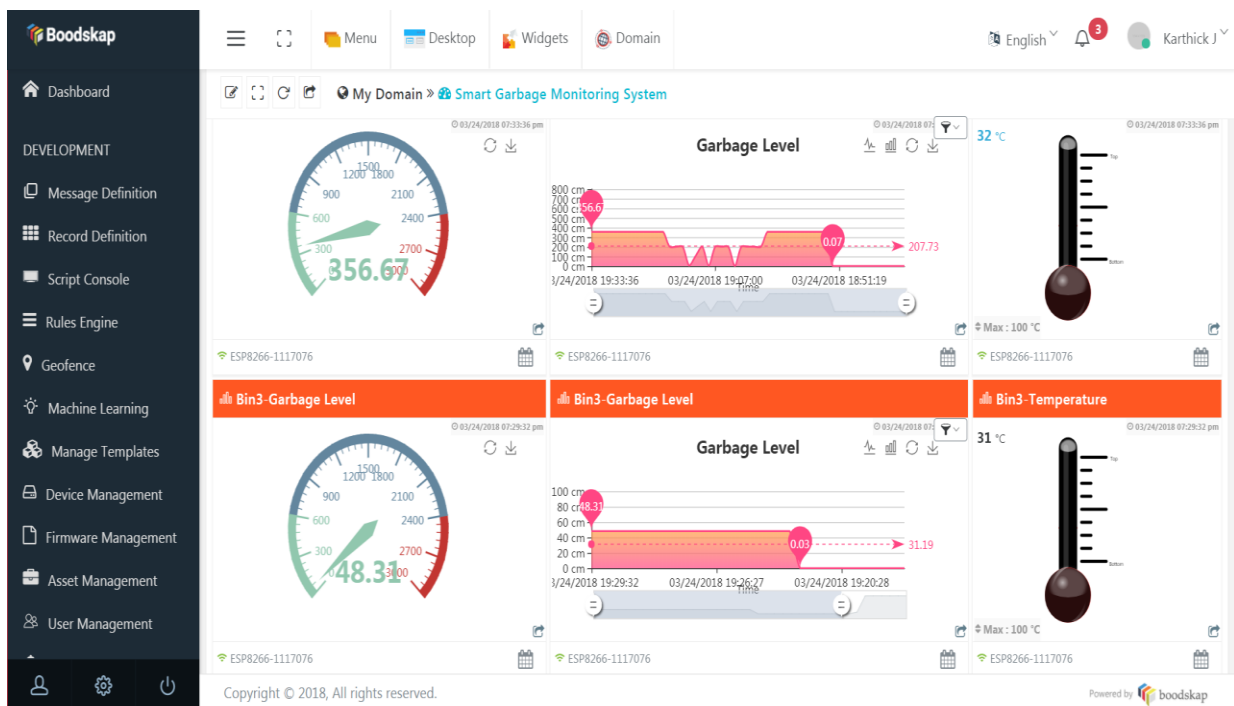
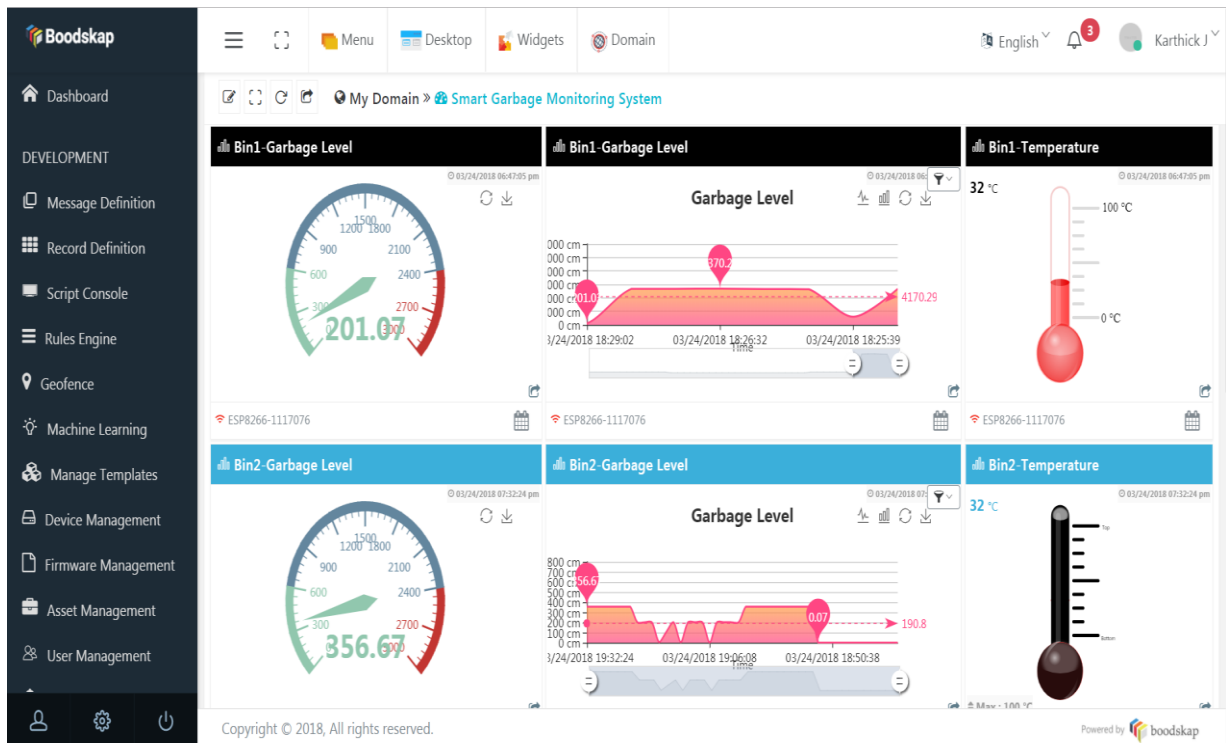
DASHBOARD:(BOODSKAP IOT DASHBOARD)

In this scenario we monitored three Dust Bin Gargabe level and Temperature level.





Node MCU interfaced with Ultrasonic sensor which in turn collects Garbage levels from the Dust bins and sent it to the Boodskap cloud so that the City municipality corporation will have the dashboard setup they will monitor and take necessary action immediately to clear the Garbages from the dust bins. Dashboard screenshots shows three bins with their levels of waste and temperature.



PROJECT CODE LINK:

<https://github.com/karthickcj/Smart-Garbage-Monitoring-System-Using-IoT.git>

