IOT BASED GARBAGE MONITORING SYSTEM USING ARDUINO AND ETHERNET SHIELD

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ABSTRACT

For a better lifestyle cleanliness is needed, and cleanliness starts from the bins. In the recent decades, Urbanization has increased tremendously. At the same phase there is an increase in waste production. Waste management has been a crucial issue to be considered. This paper is a way to achieve this good cause. In this paper, bin is built on a microcontroller based platform Arduino board which is interfaced with Ethernet shield and Ultrasonic sensor. Ultrasonic sensor set three level of the dustbin at 10cm, 25cm, 35cm displayed with three different color blue, green, red respectively which will measure the stature of the dustbin. The threshold stature is set at all level. Arduino will be programmed in such a way that when the dustbin is being filled, the remaining height from the threshold height will be displayed with their respective color. Once the garbage reaches the threshold level ultrasonic sensor will trigger the Ethernet shield created webpage which will continuously alert the required authority until the garbage in the dustbin is squashed. Once the dustbin is squashed, people can reuse the dustbin. At regular intervals dustbin will be squashed. Node-red a online editing tool which is used to show the real time access. The sole objective of this paper is to create awareness on cleanliness.

Keywords: Arduino Uno, Ethernet Shield, Ultrasonic sensor, Node-red ,

INTRODUCTION

India receives 23.3 million foreign and domestic tourists yearly and as being such a hotspot of tourist attraction it become necessary to keep our country clean and it become more important to deal with a major problem, GARBAGE!

Pictures of garbage bins being overfull and the garbage being spilled out from the bins can be seen all around. A big challenge in the urban and monumental cities is solid waste management. Hence, smart dustbin is a system which can eradicate this problem or at least reduce it to the minimum level. Our Indian government has introduced the concept of implementing 100 smart cities in India. “Swachh Bharat Abhiyan” was initiated to ensure a clean environment. Majority of viruses and bacterial infections develop in polluted environment. Safeguarding the environment using technology sources is needed at present. Majority of the public environment seems to be polluted with the waste material. Amounts of waste are largely determined by two factors: 1. the population in any given area, and 2.Its consumption patterns. According to the ministry of home affairs, between now and 2025, India population will increase by 4% to reach 2.45 billion inhabitants (from 1.35 today).With this increase in population, the responsibilities towards waste management also increases. Our waste

administration frameworks and our economic situations, even taking care of business, are unequipped for taking care of the developing measures of waste universally.

This paper gives us one of the most efficient ways to keep our environment clean and green. Dustbin is a common means and a basic need everywhere. It is observed that often the garbage get collected due to irregular removal of garbage present in the dustbin. In the proposed paper, a new model for the municipal dustbins which intimates the center of municipality for immediate cleaning of dustbin has been proposed.

STUDY OF EXISTING SYSTEM

The existing garbage monitoring system were developed to achieve the objectives as monitoring the waste management, providing a smart technology for waste system, avoiding human intervention, reducing human time and effort, resulting in and waste ridden environment.

In the existing system the server maintain the detail of the unfilled bins, filled bins and authority registration. Whenever the normal user or authorized bin collect or request from the database the information will be given to them. The information to the normal user is about the nearest unfilled bin and authorized person will be given the coordinate of the filled bins. The threshold is set on the bins up to which they will be filled and after reaching the threshold value the buzzer will be put on automatically which will alarm the authority. The existing system shows the high dependency on electronic components which make it sometimes vulnerable to total collapse. No assurance is provided for the security to prevent damage and theft to the bins from the human intervention. No proper connectivity with the rural areas which make it inefficient as most of the population still inhabitant in the smaller locality and as more the population more is the dump which leaves these people no beneficial to this innovative initiative.

The existing system does not provide proper graphical interfaces for the server and the other component of application which scaled down the impact of the existing system and paved a way to establish better system technology.

PROPOSED SYSTEM

In our project work, demonstration is carried on a single bin of 40cm which is divided into three compartments 15cm, 10cm, 15cm each denoting filling of garbage with different colors blue, green, red respectively. The level of garbage in the bin will be displayed on the website which will track down the data in how many days the following bin is getting filled up to the red mark. The database is maintained to analyze the number of days in which the garbage bin is filled which will reduce our dependency on the electronic components and also improve the decision making and we can assign normal user to pick up the garbage from the bins after this interval of time. Our system will provide high feasibility and decoupled the with respect to the optimal determination of the bins and vehicles or the algorithm which provide the best route for vehicles. Our system also will contribute towards the progress of "Swacch Bharat Mission" an initiative by our government.

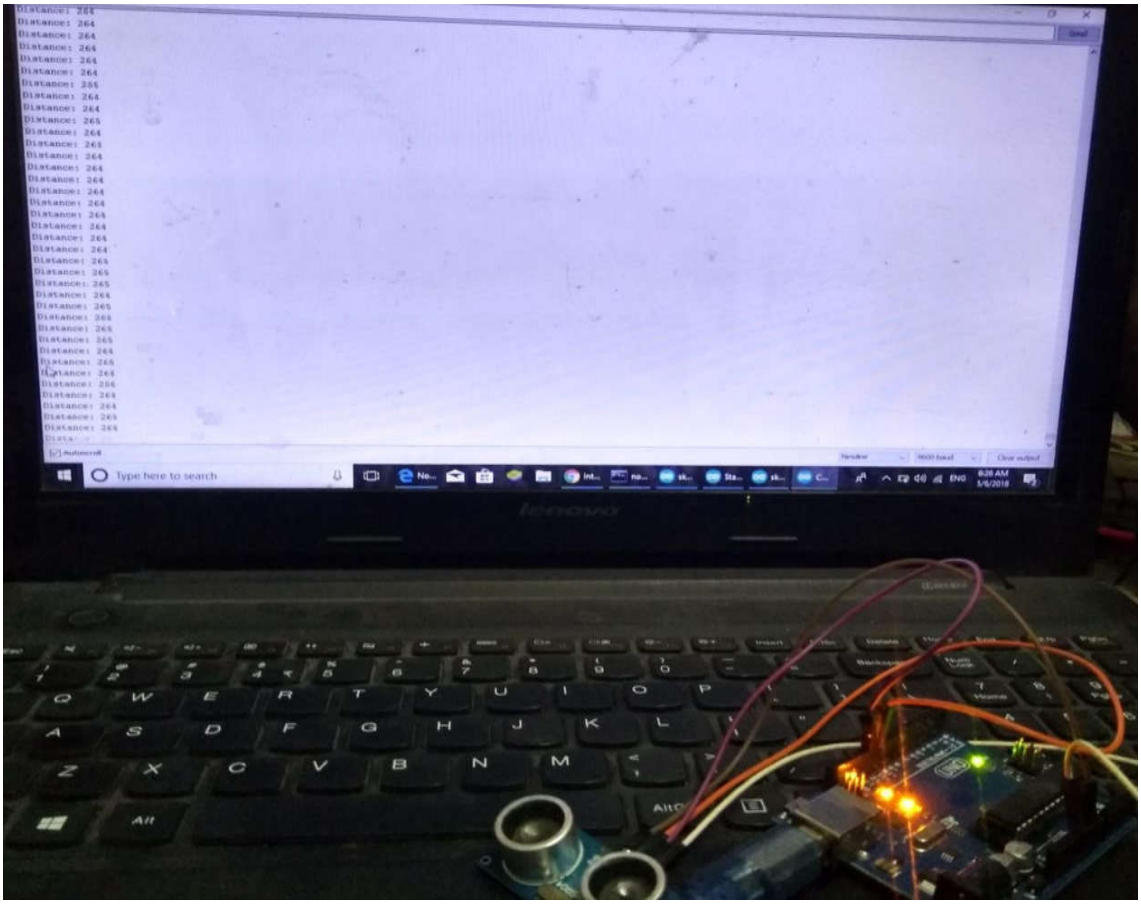

Figure.1: VISUALIZATION OF THE DATA

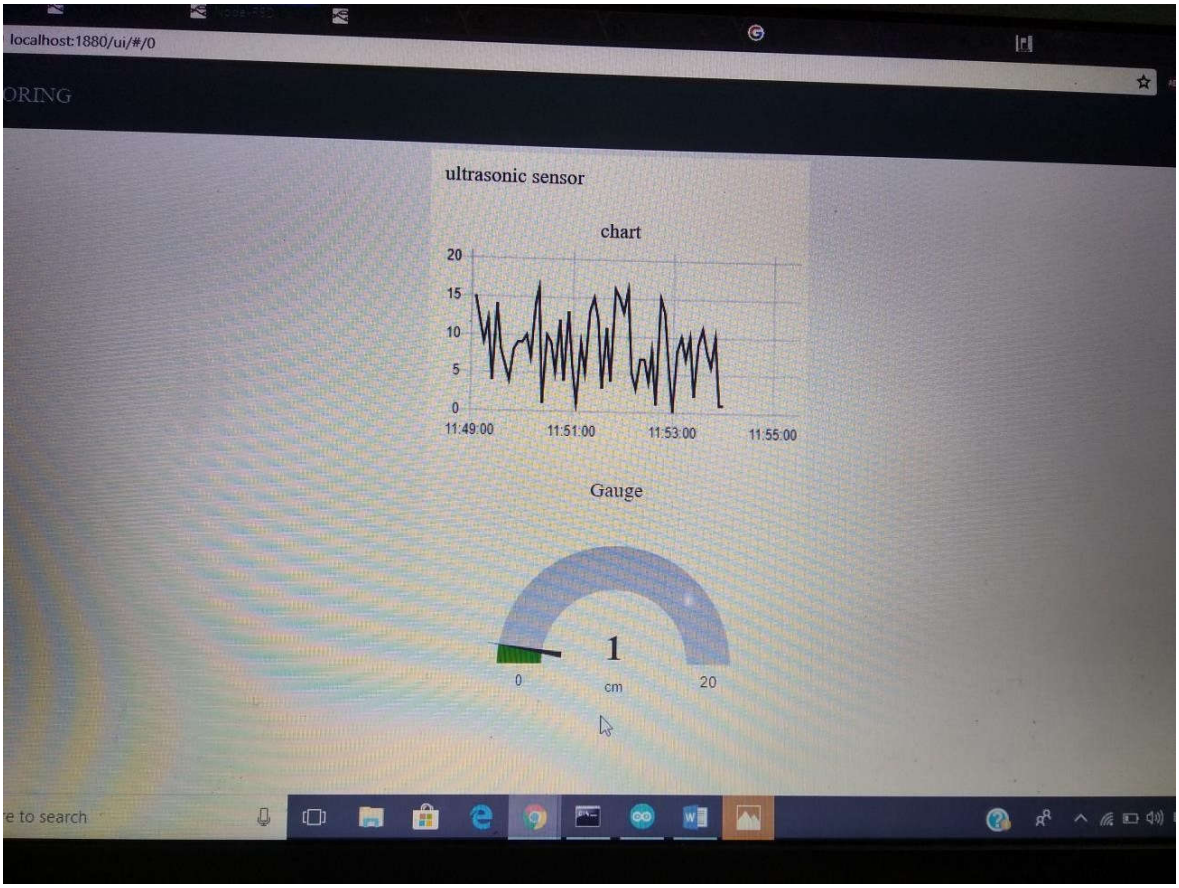

Figure 2. REAL TIME SENSING

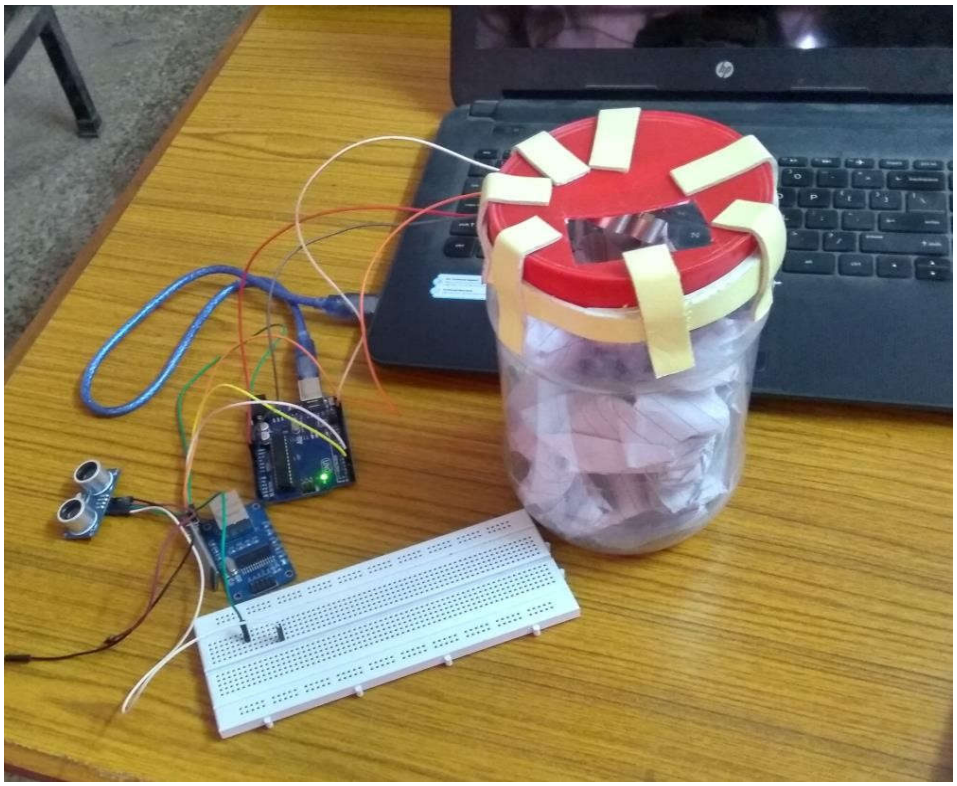

Figure 3. COMPONENT OF PROJECT

CONCLUSION AND RESULT

In this project, an integrated system of Ethernet shield, IOT, Node-red, Ultrasonic Sensor is introduced for efficient and economic garbage collection. By implementing this project we will avoid overflowing of garbage from the container in residential area which is previously either loaded manually or with the help of loaders in traditional trucks. It can automatically monitor the garbage level & send the information to the organization. The technologies which are used in the proposed system are good enough to ensure the practical and perfect for garbage collection process monitoring.

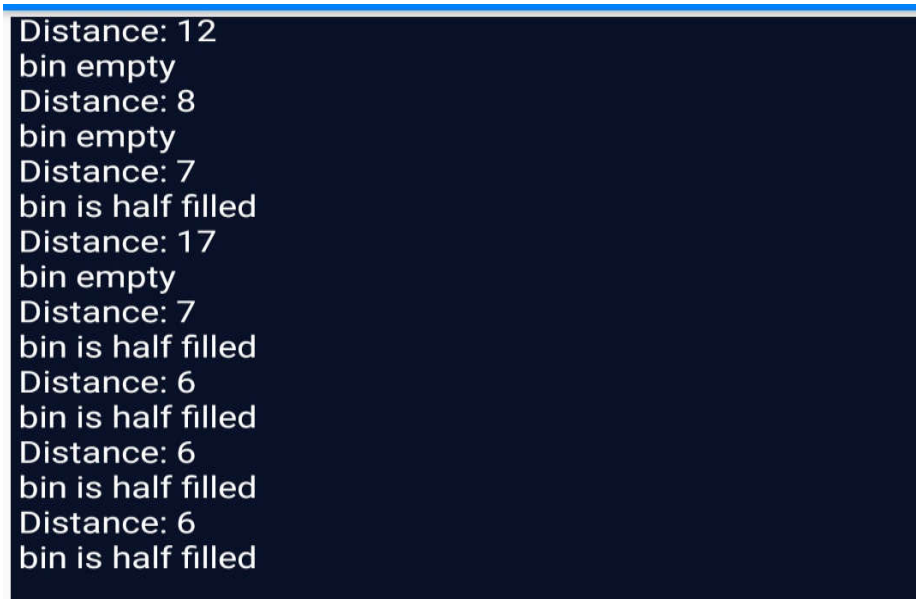

Figure 4. FINAL RESULT

FUTURE ENHANCEMENTS

In this paper, implementation is done only for a single bin. Integration of many bins each with a unique ID can be done by implementing the principles of IOT and creating database for each bin which can be maintained by using SQL technology and a login webpage is created to ensure authorized entries. Apart from this, differentiation can be made between dry trash bin and wet trash bin collecting plastic dry waste and biodegradable waste respectively. Concept of green points that would encourage the involvement of the residents or the end user making the idea successful and helping to achieve joined efforts for the waste management and hence fulfilling the idea of Swacch Bharat. This helps in distinguishing the waste at the source and hence reducing the requirement of manpower. Having a case study on the types and times the waste is collected after how many days the bins are filled can be predicted and reducing our dependency on electronic devices. We can also implant a router on the bins in the community parks, gardens which will be activated when the bins are filled up to a certain level which will make it inevitable for the people to keep the surrounding clean.

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