2nd Buffalo Day *for* 5G and Wireless Internet of Things

LoRa Based Smart Waste Management System for A Clean Environment

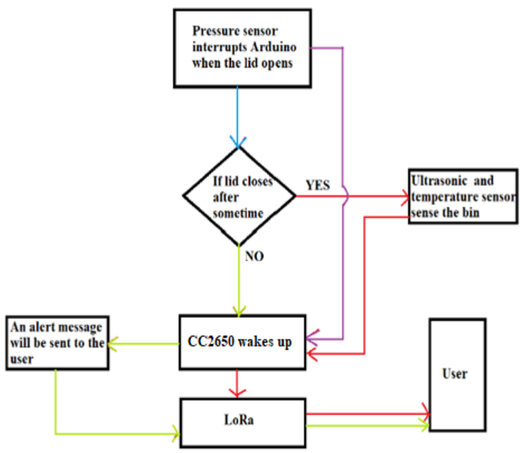
Falguni Bonawate, Manisha Srinivasan

Introduction

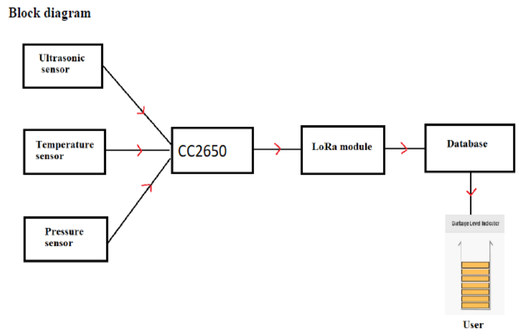
The main aim of our project is to detect the waste level in the garbage bin and to notify authorities. For this we have used three sensors (temperature, ultrasonic , force resistor) to know the condition of the waste level in bin and with the help of the LoRa module the data is transmitted to the user.

Method

When the lid opens, the force resistor sensor will send an interrupt to CC2650 Launchpad to wake up and then it will sense whether lid is closed then by utilizing an ultrasonic HC-SR04 and temperature sensor the status of the bin will be measured so each time the lid opens and closes the waste level will be checked and send to LoRa Microchip RN2903A then it will be transmitted to a server that stores all the pieces of information. Later it will be informed to the user using HTTP protocol if any action is needed to be taken. If the lid is not closed, then an alert message will be sent to the user.

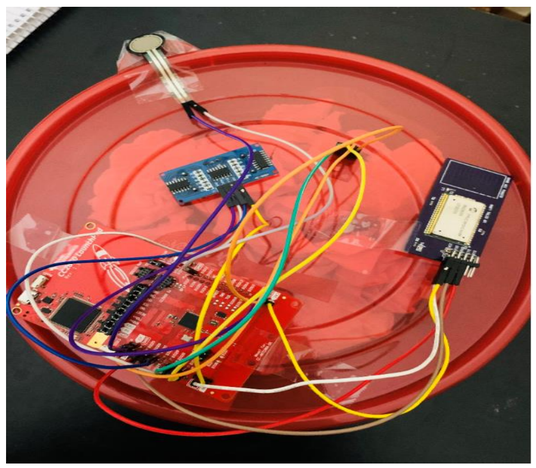


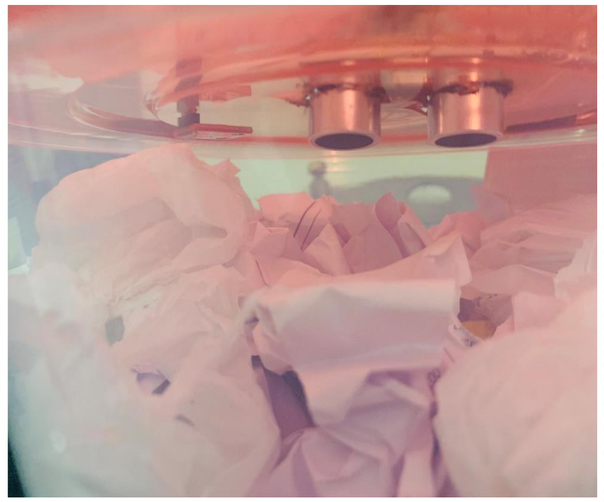
System Architecture



For data acquisition, an ultrasonic sensor is used to senses the level of the waste in each bin, a force resistor sensor to finds whether the bin lid is closed or open, and a temperature sensor is to finds any kind of emergency like a fire inside the bin. Then for processing the obtained sensor data the CC2650 launchpad is used and the processed data is sent to the LoRa module for communicating purpose. All this information will be stored in a server where the users can monitor each bin. The software we used is code composer studios.

Hardware System

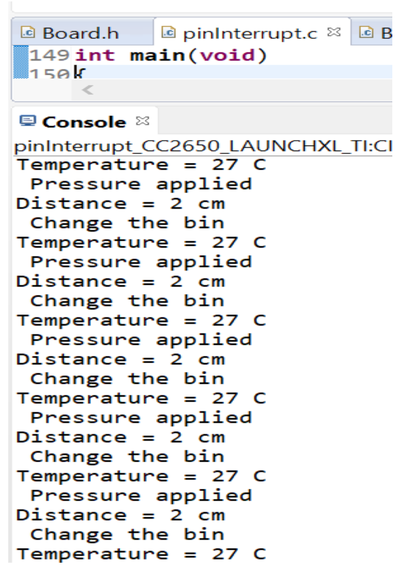




Results

We monitored the level of the waste in the garbage bin and sent data to LoRa gateway. That data is accessed by user using web page.

Pressure	Distance (cm)	Temperature (C)	Level	Alert
Applied Twice	7	28		-
Applied Twice	5	28		-
Applied Twice	2	27		Change the bin
Applied Twice	10	30		-
Applied Once	-	-	-	Lid is open



Conclusion

We developed LoRa based waste management system using Ultrasonic, force resistor and temperature sensor. The main benefit of using this is it informs the authorities exactly which bin needs to be changed so this reduces the manpower, fuel usage. This maintains good environmental conditions like no overflowing bins with unpleasant odors.

References

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University at Buffalo The State University of New York

Department of Electrical Engineering
School of Engineering and Applied Sciences
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