

Garbage Management System for Smart City using Lora Technology

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Abstract -Waste is an important issue, which needs to be tackled smartly. Wisely we segregate the waste at our homes for ease at processing and recycling .We absorbed trash cans/trucks come irregular to home creating a devastate of household. Due to this many civilians empty their overloaded dustbins in open spaces this in turn increases environmental pollution. This system aims to monitor trucks by finding shortest path for almost filled waste bins which have produced harmful gases and also provide a route for collection. The system will consist of setting up the smart waste bins/trash cans for society which will be Lora enabled. During this paper, sensible bin is constructed with Arduinio microcontroller that is interfaced with URAT and IR sensors. These smart bins will transmit information about its fill status and harmful gas levels and also provides estimated dates for collection of waste, real time bin status, expected fill up dates for bins and optimized shortest path for waste collection. The system will summarize the collected information and generate reports.

Key Words: Lora, Arduinio, URAT, IR.

1. INTRODUCTION

We are living in an age where duty and systems are fusing together with the power of electronic gadgets to have a more efficient system of working and to execute jobs quickly! with all the power within our grasp this is what we have come up with.

One of the main concerns with our environment has been solid waste management .Today waste management from its establishment to its disposal is one of the important challenges for the municipal corporations in all over the world. Dust bins placed across cities set at open places are flooding because of addition in the waste each day and making unhygienic circumstances for the citizens, to maintain a strategic distance from such a surrounding we have proposed wireless garbage management system for smart cities which allows municipal corporations to monitor status of dustbins remotely over wireless and keep cities clean very efficiently by enhance cost and time required for it. As soon as dustbin has reached its extent level, waste management department gets alert via SMS via gsm module placed at dustbin so sector can send waste collector vehicle to respective location to collect garbage.

LoRa(long range) have geolocation capabilities used for triangulating positions of devices. In addition, the assert of wireless communication technologies makes the deployment more easier in both internal and external spaces. A prototype of low consumption wireless node is

established to obtain measurement of weight, filling and volume of the waste bins .This is LoRa technology based garbage management system, an innovative way that will help to keep the cities clean and green.

2. RELATED WORKS

In this Section we have studied few papers which show that deep learning about the garbage management

- A. Belal Chowdhury, Morshed U Chowdhury proposed "RIFID-based Real-time Smart waste management system "here the architecture is described in the area of RFID and sensor based on (WIWSBIS) which lead to false that sensor nodes used in dustbins have limited memory size.
- B. Andrei Borozdukhin, Olga Dolinina and Vitaly pechenkin proposed "Smart clean city" by dynamic optimal route and formal the optimization criterion for time-optimal garbage collection which comes with drawback of finding difficult to work across departments and boundaries.
- C. Dr.N. Sathish Kumar, Vijayalakshmi, R. Jenifer proposed "IOT based smart garbage alert system "this process aided by ultrasonic sensor which lead to require battery life of SGB.

3. PROPOSED SYSTEM

The proposed system offers remote monitoring of the realtime bin status data from two sensing systems: waste filled level sensing, weight sensing and also with this harmful disease was reduced. This system consists of three sensors where the ultrasonic sensor to measure the waste level, IR sensor capable of measuring the level of garbage, gas sensor for detecting harmful gases and the GSM module to send the SMS, and an Arduinio uno which controls the system operation.

Fig1: BLOCK DIAGRAM OF THE PROPOSED SYSTEM

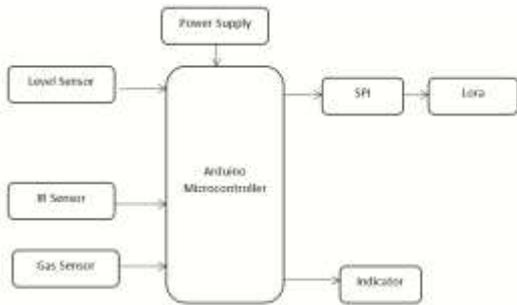
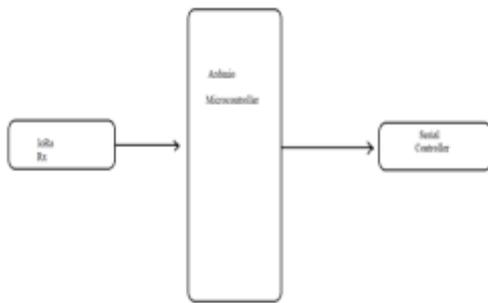


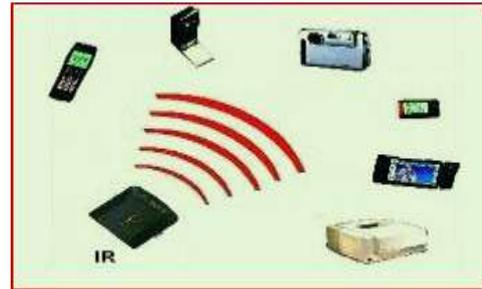
Fig2: BLOCK DIAGRAM OF RECEIVIER SECTION



b. IR(INFRARED)SENSOR

An infrared sensor is an electronic gadget that transmit so as to detect a few parts of the environment. An IR sensor can quantity the warmth of an item as well as detect the motion. An infrared sensor circuit analogous to human’s visionary senses, which can be used to detect obstacles and it is one of the common applications in real time.

Fig4



c. LEVEL MEASUREMENT

Level sensors are one of the very important sensors and play very vital role in variety of consumer applications. As with other type of sensor, level sensor suiting to the application requirement is very important. Continuous level sensors measure the level to determine the exact amount of substance in continuous manner. Point level sensor indicates whether the substance is above or below the sensing point.

Fig5:



4. MATERIALS AND METHODOLOGY

a. ARDUINO UNO

Arduino consist of an open source, PC paraphernalia and programming organization, endeavour, and client group that plans and manufacture microcontroller packs for constructing programmed devices and brilliant object that can detect and control questions in real world. The Arduino Uno is a microcontroller board consist of the ATmega328. It has 14 digital input/output pins,6 analog inputs ,a 16 MHZ crystal oscillator, USB connection, a power jack, an ISCP header ,and a reset button which has storage EEPROM.

Fig3:



d. GAS SENSOR MODULE

Gas sensors are available in wide specifications depending on the sensitivity levels, type of gas to be sensed, physical dimensions and numerous other factors. It consist of steel exoskeleton under which a sensing element is housed. This sensing element is mattered to current applications through connecting leads.

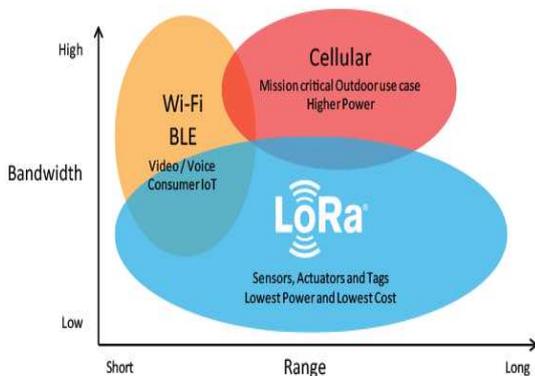
Fig6:



e. LORA TECHNOLOGY INTERFACING

In LoRa we can attain high distance communication without using much power, thus overcoming the drawback of Wi-Fi and BLE communication. In order to attain high distance with low power LoRa compromises on Bandwidth, it operates on very low bandwidth. The maximum bandwidth for Lora is all over 5.5kbps, this means that you will be able to send only small amount of data through LoRa. So you cannot send Audio or video through this technology, it works great only for transmitting less information like sensor values. The below chart shows where lora lies compared with Wi-Fi, Bluetooth and cellular devices.

Fig7:



f. SERIAL PERIPHERAL INTERFACE (SPI)

The Serial peripheral Interface is an synchronous serial connections interface protocol commonly used to send data to microcontrollers for communicating with one or more outlying devices rapidly over short distances. It can also be used for communication between microcontrollers and small peripheral. The following table display on which pins are the SPI lines which are broken out on the various Arduino boards.

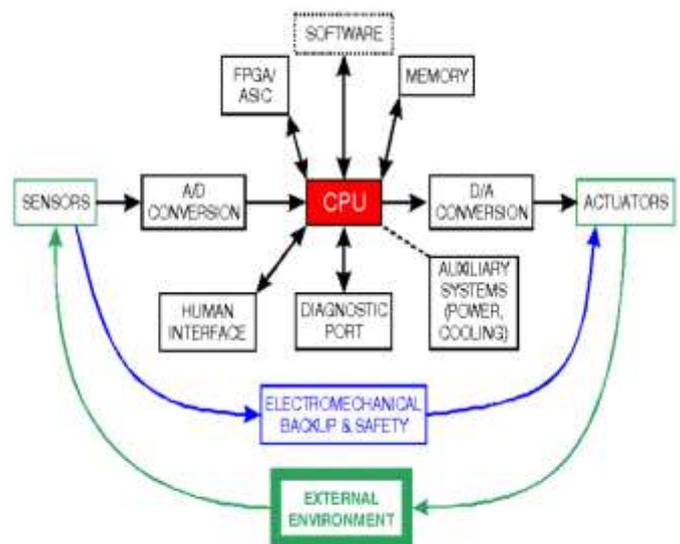
Fig8:



g. EMBEDDED SYSTEMS

An embedded system usually carry an embedded processor. Many device that have a digital interface -- microwaves, VCRs, cars -- make use of embedded systems. Some embedded systems comprise an operating system, Others are exact specialized resulting in the complete logic being implemented as a single program. These systems are embedded into some device for some specific purpose other than to supply general purpose computing

Fig9:



5. CONCLUSION

In this paper, we proposed garbage management using Lora communication has been done with Arduino microcontroller and with the supported peripheral. The output has been demonstrated and verified in the serial monitor of the microcontroller, the future work could be that, is can be used in various places to overcome communication error and more fast compared to Zigbee and it will be cost effective and time efficient process.

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