International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 05 Issue: 05 | May - 2021 ISSN: 2582-3930

Smart Garbage System Using GSM

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Abstract -Piles of rubbish are one of the major problems faced by most people in India, especially those who live in flats, as the number of bins is limited and shared among all residents. It may cause pollutions, which may lead to sanitary issues and diseases. This project presents the development of a smart garbage monitoring system in order to measure waste level in the garbage bin in real-time and to alert the municipality, in particular cases, via SMS. The proposed system is consisted by the ultrasonic sensor to measure the waste level, the GSM module to send the SMS, and an Arduino Uno which controls the system operation. It supposes to generate and send the warning messages to the municipality via SMS when the waste bin is full or almost full, so the garbage can be collected immediately. Furthermore, it is expected to contribute to improving the efficiency of the solid waste disposal management.

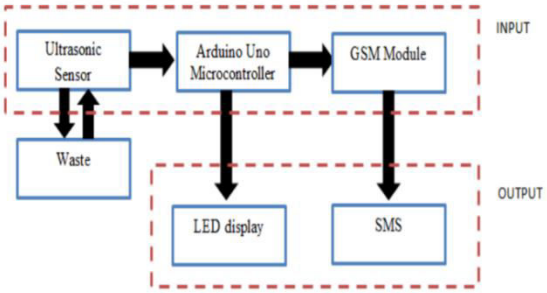
***Key Words*:**Arduino Uno, GSM, Ultrasonic Sensor, Buzzer.

Introduction:

Nowadays, there are tons of flats and apartments which have been built in the rapid urbanization area. This is due to high housing demands which have been drastically risen as a result of migration from villages to cities to find works. In order to accommodate the growing population in the urban area, the government has built flats, apartments or condominiums, to provide shelter for them. Besides, flats become popular mainly in the United State, Europe and other developing countries. There are several issues faced by the inhabitants of the flats. One of them is the issue of the domestic solid waste disposal, which cause pollutions. Unlike landed houses, the flats' waste disposal bins are shared among all residents which live in the same building, and thus, the bins tend to be filled very quickly. Thus, an unsystematic and inefficient disposal waste management may cause the bins to be always full with of garbage, and further littering from the residents will cause the garbage piles to be scattered outside the bins. Therefore, there will be a question of sanitary as those garbage piles may become the root cause of illness and diseases like dengue, diarrhea, and cholera. Besides, there are also problems regarding the attitudes of each inhabitant of the flats. There are cases where some irresponsible residents, who normally live at the higher levels of the building, littered or simply threw their domestic waste directly from the floor which they live into the bins. This may cause pollutions if the garbage thrown fell outside the bins or injuries to innocent people downstairs if they fell onto them. The waste disposal can be managed more properly and efficiently by constantly monitoring the bin status and the garbage level. In addition, the municipality can be alerted when the bin is full or almost full, thus promoting dynamic scheduling and routing of the garbage collection. By comparing to the conventional static scheduling and routing, this dynamic scheduling and routing are said to allow operational cost reduction, by reducing the number of trucks, the manual labor cost and the transport mileage savings .This paper presents an alternative in managing domestic waste especially in flat areas via a smart garbage monitoring system, which is developed based on Arduino Uno. This system will automatically monitor the garbage level at each bin and will alert the municipality in the case where the bins are almost full.

Block diagram of proposed system:

The IOT garbage monitoring system is built on Arduino board platform It is interfaced with GPS module and compost is fortified with ultrasonic sensor. The hardware such as AVR family microcontroller, LCD display, 12V transformer, Resistors, Capacitors, Diodes. The software provisions are Arduino compiler, MC Programming Language C.



Hardware Used:

- Arduino Uno
- Ultrasonic Sensor
- Buzzer
- LCD Screen
- Jumper wires
- GSM Module
- Adapter
- Plastic Dustbin

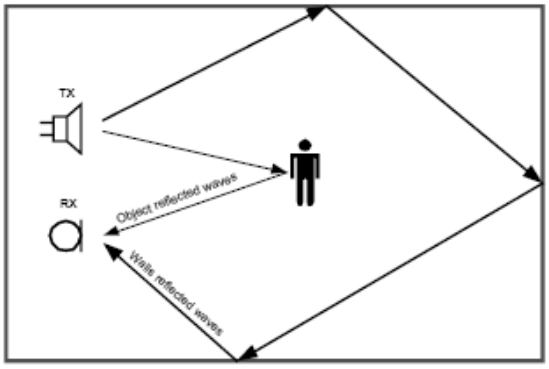
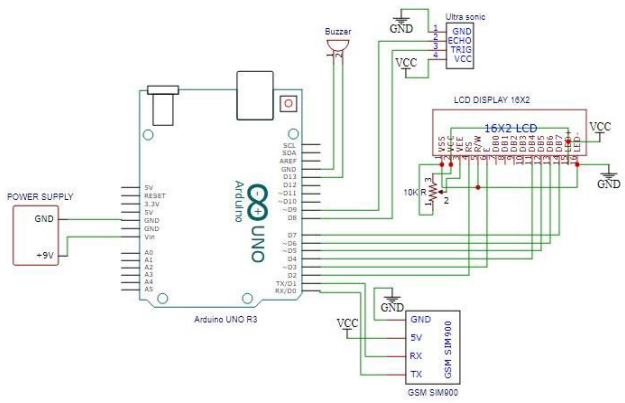


Figure : Basic Sensor Operation Principle

Circuit Diagram:

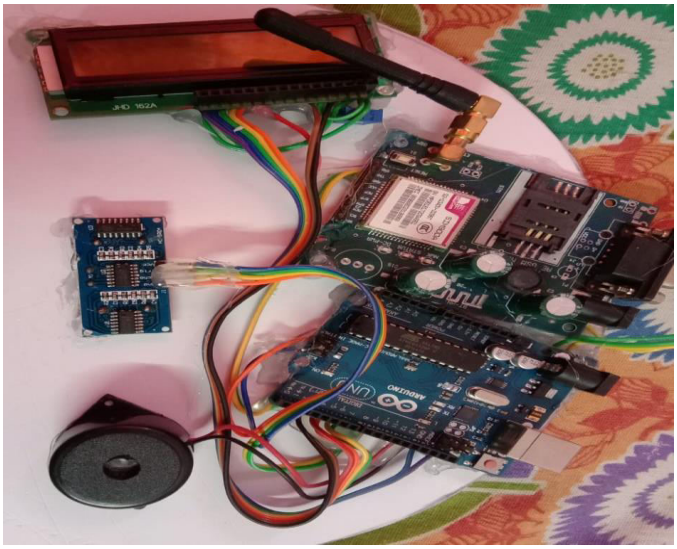


Software and Analysis:

Every smart bin is equipped with ultrasonic sensors which measure the level of dustbin being filled up. The container is divided into three levels of garbage being collected in it. With its continuous use the levels get filled up gradually with time. Every time the garbage crosses a level the sensors receives the data of the filled level. This data is further send to the garbage analyzer as instant message using GSM module.

Concept behind Smart Garbage System Using GSM

At first, the level or the height of the garbage in each bin is measured by using the ultrasonic sensor. This information is then received and processed by the Arduino Uno. It will determine whether the garbage level has been surpassing the threshold level or not. For this research purpose, there are two threshold levels sets: the first threshold is at 50% of the bin height, and the second threshold is set at 75% of the bin height. If the garbage level in the bin is crossing the first threshold level, then the first warning message is generated and sent to the municipality. Besides, the buzzer will indicate in order to alert all the residents at every floor. Next, if the garbage level in the bin is crossing the second threshold level, then the second warning message is generated and sent to the municipality. In this case, all the residents will be alerted when the buzzer sounds.



Result:

The following are the results which obtained from this work.

- Waste level detection inside the dustbin.
- Transmit the information wirelessly to concern.
- The data can be accessed any time and from anywhere.
- The real time data transmission and access.
- Avoids the overflow of the dustbin.

This IoT beached waste management is very useful for smart cities in diverse aspects. We have seen that, in cities there are dissimilar dustbins located in different areas and dustbins become over flown many times and the concerned people do not get info about this. Our system is designed to crack this issue and will offer complete details of the dustbins located in different areas throughout the city. The allocated authority can access the information from anywhere and anytime to get the details. Accordingly they can revenue the decision on this immediately.

Disadvantages of the existing system:

Time consuming and less effective, high costs, creates unhygienic environment and look of the city, bad smell spreads and may cause illness to human beings.

Advantages of the proposed system:

Real time information on the fill level of the dustbin, development of the dustbin based on the actual needs, cost reduction and resource optimization, effective usage of dustbins.

Conclusion:

The IOT-Garbage monitoring system pays a lot towards clean and disinfected pollution less environment in building a smart city. As these technology is new in India there should be appropriate consciousness and alertness among the public before the operation of this technology. Otherwise, sensitive devices like sensors might be spoiled due to rough action of the users. It is an automatic dust bin monitoring system in order to sense the full condition of the garbage bins. This providesthe authorized users appropriate updates of the location of the garbage bins and thus eliminates the need of intermittent manual checks and overflowing garbage bins. This method finally helps in keeping the environment clean. Thus, the garbage collection is made more efficient, effective and operative.

Acknowledgement:

Our Precious gratitude intended for the lecturers of our department and concerned people because without their help, it is very difficult to complete the work presented in this paper.

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