

# IOT Based Garbage Monitoring system

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## Abstract

The aim is to cover all the rural and urban areas of the country to present this country as an ideal country before the world. With the proliferation of Internet of Things (IoT) modules such as smartphones, sensors, cameras. It is possible to collect massive amount of garbage. In the metropolitan cities it is not possible to check each and every place where the garbage dump yard is full or not. So we have introduced a new concept using load cell. This is a sensor which intimates about the load placed on it. So that the garbage can also be checked in this way. Here we are using AT89S52 as our controller. A threshold value is set in the controller. Controller will monitor the status load cell. When that value is met then an intimation will be sent to the officials through IoT about the over load and also to clear the garbage as soon as possible.

Keywords: Load sensor, IOT module, AT89S52, embedded system,

## 1.Introduction

As it stands, we are currently moving towards one of the most difficult phases of the country in terms being able to handle the amount of waste that the country produces each year. India is one of the fastest growing economies and which such big task comes the task of not only being able to develop the country to be economically sound but also to help our citizens grow and aid the nation in becoming a developed nation. All of this comes with the adaptability to technology and to be able to use it to our

are prone to rise, hence our project here is to take on such issues that we often ignore or take for granted. That begins with managing the garbage produced. Generation of garbage or waste is increasing very highly with the increase of population, industrial development, change in consumption habit and the movement of the population into a more luxury life, where they do not really bother on pondering over the waste management.

## 2.Literature Survey

In the above mentioned papers we notice different studies that emphasize on the need to be able to manage the amount of waste being generated and what percent of people actually take up the responsibility and take steps to ensure this. Also we can see how IOT modules are used to detect or track the waste for different waste bins or locations to be specific. We can also observe how with the use of IoT we can communicate between different devices and provide better solutions. From [1] and [2] we can observe that a major percentage of waste is generated by building in different forms. This tends to put forward a simple observation that a very minor percentage of people actually take up the responsibility and regulate the amount of waste being generated from these main sources. Therefore this issue needs a proper solution.

In [3] and [4] we can see how the IR sensors placed at appropriate position and ideal conditions can help detect the level of the waste generated and so be used to detecting the amount generated and equally take action on the same. Also in [5] we can observe that minimal number of sensors placed at appropriate places can prove cost effective and very efficient but still a way for proper real time notification is not present. The paper [6] explains us how the wifi chip can be used to communicate between different devices and therefore bring about many solutions in embedded systems. Therefore our literature survey identifies

- Need for solution to manage the amount of waste generated

- Detection using load sensors present but no method of real time action to be taken on the same.
- Occupancy detection system present but no flexible security feature present
- An integrated system for room light control and real time occupancy monitoring is not available.

### 3. Methodology Adopted

The input to the circuit is applied from the regulated power supply. The a.c. input i.e., 230V from the mains supply is step down by the transformer to 12V and is fed to a rectifier. The output obtained from the rectifier is a pulsating d.c voltage. So in order to get a pure d.c voltage, the output voltage from the rectifier is fed to a filter to remove any a.c components present even after rectification. Now, this voltage is given to a voltage regulator to obtain a pure constant dc voltage. Also all this information is sent to the user over the internet using an IOT module which he can view over the internet on a browser. The components required for this are

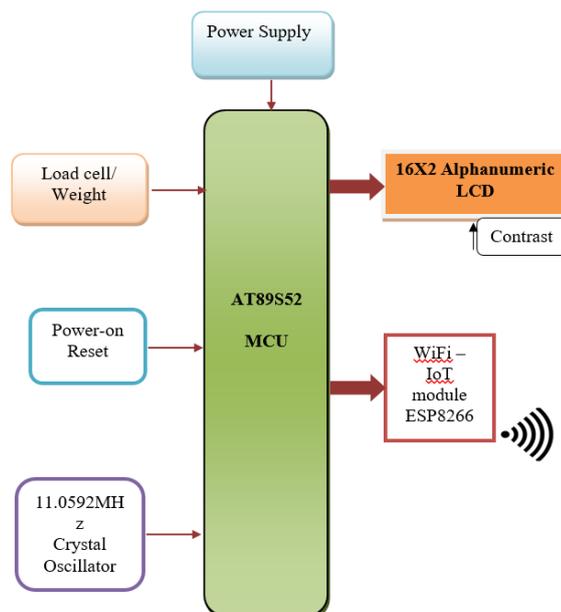


Fig 1. Architecture of the system

Whenever the Smart Trash Bin is filled up to the specified

that is transmitted by transmitter fitted in the Smart Trash Bin. The signal transmitted by the transmitter is received by the receiver which is present at the local base station. After receiving the signal, the local base station decodes the trash bin location and accordingly sends a signal to the smart monitoring and controlling hut which sends signal to Smart vehicular system about the location of the trash bin. The monitoring and controlling hut in addition to the site of bin also sends the dumping data to the municipal authorities. In addition to the added advantages of being able to monitor the garbage bin over various areas, we have tried to incorporate a feature, where the overflowing bin location, when triggered could send out an alert message to the authorities for them to take immediate action over a particular location. This particular feature further enhances the capability that this particular product or project brings to the table. This adds to the existing feature of being able to monitor, but when the authorities are away, it gives them an added option of continuous monitoring and propels them to take immediate action.

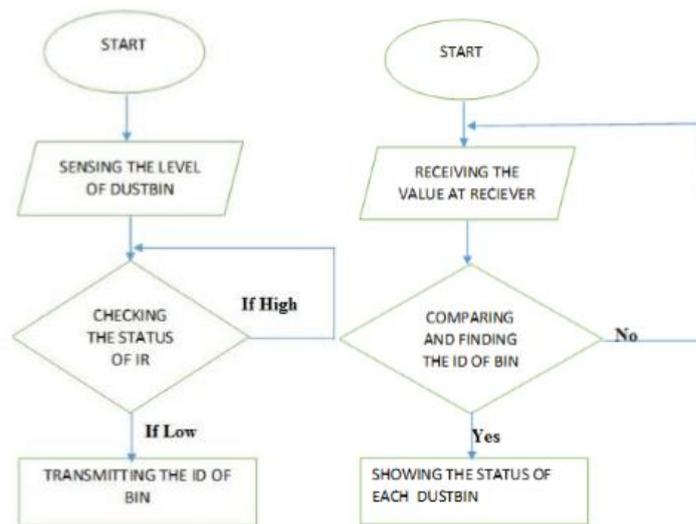


Fig 2: Notification process

As stated earlier since the aim is to provide the basic and most important functionalities need to be very reliable. There is no scope for failure of the system. In case the system fails in any scenario it would lead to overflow and hence could bring a lot of

time till the system is fixed. Therefore it is important for the system to regressively tested and designed in such a way that it works in every possible scenario and exceptional cases. Also it should be designed it such a way that if it ever fails it can be shifted to a manual operation. Also as no system can ever be 100 percent efficient the team should provide quick response and support whenever the need arises.

## 4.Results

The following are the results which were observed as a result of implementing the product:

- Waste Level detection inside the dustbin.
- Transmit the information wirelessly to local authorities.
- The data can be accessed anytime and from anywhere
- The real-time data transmission and access
- Avoids the overflows of Dustbins

This IoT based waste management is very useful for smart cities and even the rural areas as equally. Even in the rural areas lack of the garbage management has been leading to various diseases that have been taking shape in different aspects. In order to eradicate this kind of widespread the root cause has to be eliminated. Hence the monitoring will widely help them take the necessary precautions and build the health in to the rural areas. We have seen that, in cities there are different dustbins located in the different area's and dustbins get over flown many times and the concerned people do not get information about this. Our system is designed to solve this issue and will provide complete details of the dustbin located in the different areas throughout the city.

The concerned authority can access the information from anywhere and anytime to get the details. Accordingly they can take the decision on this immediately. In addition to the added advantages of being able to monitor the garbage bin over various areas. we have tried to incorporate a feature. where the

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Fig 3: The IOT based garbage monitor system setup

To inform on high level of garbage. The level high results are then transmitted to the local authorities over the wifi module. This enables them to monitor and take action on the same accordingly. This particularly helps in the making the entire system more transparent and then the public are also at more of an ease, as they know they the information of a particular overflowing bin has already reached the authorities and they don't have to separately report it.

The system once set, has a very small requirement of power and hence the entire system becomes highly cost efficient. The wifi module integrated into this system aids in continuous flow of updated data into the local authorities' data bases. The system has various maker-checker processes in place to ensure that the system doesn't receive too much power or doesn't malfunction due to any transmission issues.

The unique wifi channel dedicated to the system aids the monitoring and when it is at normal level. The channel dedicated to this shows a flat line or a 0 in simple terms. We have tried to make this system very user friendly that even a laymen can make complete use of this system without much technical knowledge. High endurance and low maintenance make this system highly competent. The system operates at a very lower power and there

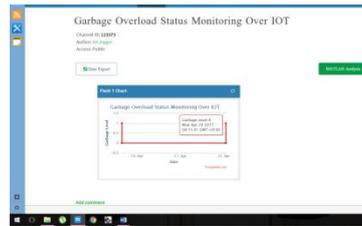


Fig 4: The garbage web portal showing the rise in the graph when the level of the garbage reaches high.

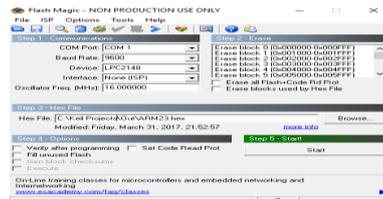


Fig 5: To dump the code into the microcontroller we have to convert the .hex file generated with selected parameters and run the code we have to use the flash magic tool.

The entire code is first written into the system and then using this mechanism we ensure that the code gets integrated into the micro controller. We have to understand that the microcontroller is the single most important component, so much so that it controls almost the entire system. Whether it is managing the signal to the components or transferring the communications to the wifi module. This all contributes to the system functioning at its optimum.

## 7. Conclusion

The ultimate objective of this study was to use the results and conclusions obtained from understanding the existing procedures in waste management in a reflective manner, in order to improve the current scenario of waste management not only in the urban areas but to be able to spread it to the rural areas. This has to be built more along the lines of making it a habit that is required. It is said that the necessity is the mother of invention. Hence in the deep crisis of waste management that we face today as a country, this is a viable and a much needed requirement to be able to cope with the rising waste in this nation. There are many campaigns that have taken shape such as the Swachh Bharat

best time to ponder and act on waste management in a forward direction. This study has led me to devise more controls on the waste management of group projects. Our system caters to automate the most basic and very important service in buildings that the garbage levels are monitored continuously. Therefore our system needs to be very efficient and perform seamlessly without much delay also smoothly without much deviations. For this it is important to keep the logical part of the system as simple as possible and also consider all cases while designing and testing.

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