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GSM Based Smart Dustbins for Smart Cities

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ABSTRACT: In our cities, many times we see that the garbage bins or dustbins placed at public places are overflowing. It creates unhygienic conditions for people. Also it creates ugliness to that place. At the same time bad smell is also spread. To avoid all such situations we have implemented a project called GSM based smart dustbins for smart cities. In this, dustbin is interfaced with microcontroller based system having IR wireless system. If the dustbin is loaded with garbage, the status will be displayed on the screen. If the garbage is not collected in specific time then SMS will be sent to the person informing that dustbin is not cleaned yet. At the same time, status report will be updated so that the sweeper for contractor responsible for the cleanliness can be questioned for the delay. Hence an automatic system can be designed to maintain the city Clean with the help of electronics. However we see that in case there is some festival or some function, lots of garbage material is generated by people in that particular area. In such cases the garbage dustbin gets immediately full and then it overflows which creates many problems. So in situations, with help of our project the government authority person can get SMS immediately. So they will get SMS before their periodic interval visit of picking up the dustbin. Then they can go and pick up the dustbins. After every pick up interval the dustbins will be under servicing, while every dustbin's individual battery will be charged under the guidance of NMC.

KEYWORDS: Smart Dustbin, GSM, SMS, LCD.

I. INTRODUCTION

As the world is in the stage of up gradation, there is one stinking problem, we have to deal with garbage. In our daily life, we see the pictures of garbage bins being overflow and all the garbage spills out. This leads to a number diseases as large no of insects and mosquitoes breed on it. A big challenge in the urban cities is waste management not only bin India but for most of the countries in the world. Hence such a system has to be build to eradicate this problem or at least reduce it to the minimum level. This project gives us one of the most efficient ways to keep our environment clean and green. The smart city concept is still new in India, although it has received a lot of attention in few years when our present prime minister gave the idea of building hundred smart cities in India. Now with the upcoming large number of smart cities large numbers of responsibilities needs to be fulfilled. The prime need of smart lifestyle begins with cleanliness and cleanliness begins with dustbin. A society will get its waste dispatched properly only if the dustbins are placed well and collected well. The main problem in the current waste management system in most of Indian cities is the unhealthy status of dustbins. In this project we have tried to upgrade the trivial but vital component of urban waste management system that is dustbin. Now with the rise of technology, its high time we should use this technology for waste management systems. As we have seen that technology with analytics has made the world a better place to live by its application in the field of genetics, electronics etc. So in this project we have implemented electronics in order to create optimal changes in the conventional methodology of waste collection with the large amount of data that is being produced by the smart bin networks. The movement of waste across the whole city can be tracked and thus can be monitored by a single system i.e GUI, efficiently and concretely. This system can be proved to be a revolution for the whole urban waste management system of upcoming smart cities.

II. PROBLEM STATEMENT

It becomes very tedious for the respective authority to visit and collect the garbage from the place where the dustbins has been placed, because the dustbin may be not at all filled, or half filled or may be overflowing. Also, collecting the

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information and status of each dustbin is not feasible. Thus, we need a system which displays and even sends all such details to the authority so that they can send the person who can visit and perform the required action.

III. METHODS AND TECHNIQUES

In this work, the methodology we used is that when the person throw the garbage in the dustbin and it subsequently fills, a message via GSM is sent to the authority when the dustbin is thirty percent filled. Consequently, when the dustbin is filled completely a second message to the authorized person is sent giving a warning message to them so that the necessary actions should be taken. It not only gives the information of the extent to which the dustbin is filled but also sends the information regarding the weight of the garbage. Also it maintains the data log of all the dustbins placed at various areas in the cities , maintaining the weight and level up to which the bin is filled.

IV. METHODOLOGY

In this work, we have used GSM Module, IR sensors, PIC microcontroller and load cell. When the dustbin is 50 percent filled, the warning message is sent to authorized person with the help GSM Module and when it is filled up to 85 percent, the second warning message is again sent to authorized person with the help of GSM Module. It not only sense the extent to which the dustbin is filled but also senses the weight of the garbage. When the weight of the garbage is above 2kg which is the set threshold value, again a warning message to the authorized person is sent. The authorized person would then have the status of all the dustbins located at different places in that area. Now the authorized person can take the necessary action to empty the bin.

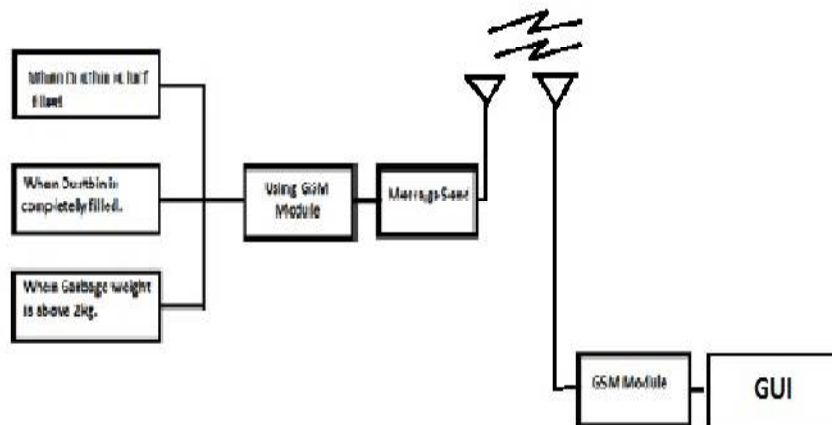


Fig. 1. Flow of Working Process

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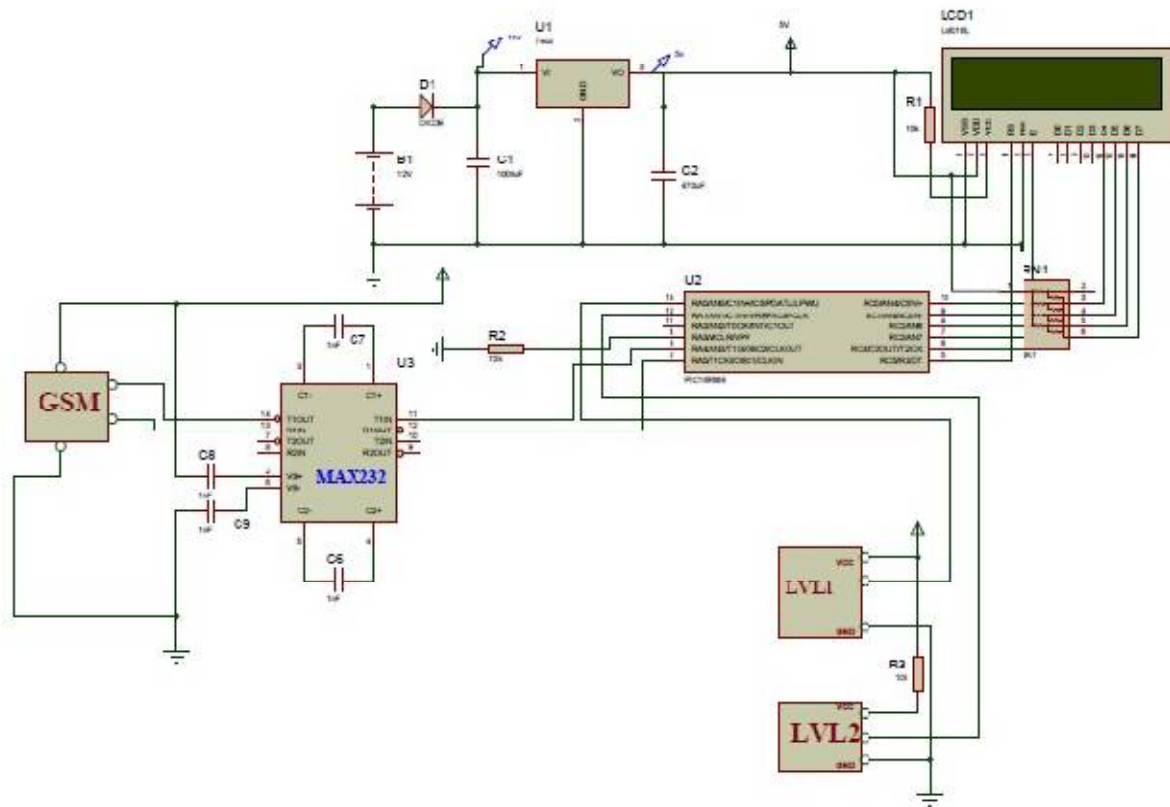


Fig. 2. Circuit Diagram of Project

V. SYSTEM IMPLEMENTATION

The figure shows the complete representation of our project in which there is a section of GSM module. Moreover LCD that is the TFT display which we are using to show the display of written complaints and also various options needed.

A. Step By Step Working

- 1) After giving supply the hardware looks as shown below
- 2) When we insert garbage in the Dust bin and the level of it is half filled, the intruder circuit detects it and transmits the message via GSM module.
- 3) Now when the top of the Dust bin is filled, the next pair of intruder circuit will detect it, and will send SMS 2 via GSM module.
- 4) After Dust bin is completely filled it will send all the messages to authorized person and it will show it on the LCD Display panel and GUI.

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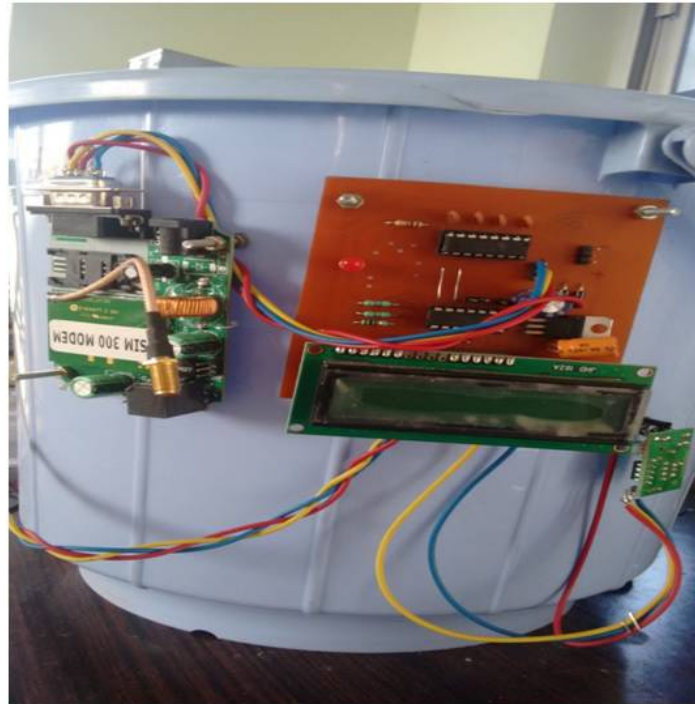


Fig. 3. Step One



Fig. 4. Step Two

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Fig. 5. Step Three

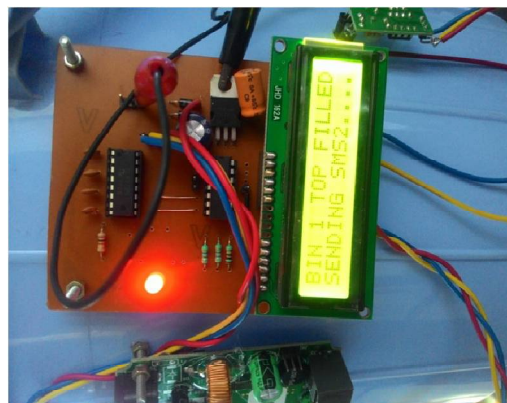


Fig. 6. Step Four

VI. CONCLUSION

The smart bins using PIC & GSM can help the authorized person to see the status of all the dustbins kept in the area and can hence sent the person to pick up the garbage, so as to keep the area clean and healthy, thus avoiding many diseases and also avoids the people to throw the garbage outside the dustbins.



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APPENDIX

SOFTWARE USED FOR CODING

The advance MP LAB experiments are designed for 32bit programming for using Microsoft micro assembler MASM 6.15. The objective of designing this lab manual is to make programming more efficient and productive. This makes our lab classes more interesting. Our objective is to learn 32 bit programming by using simulator. In this we are using Microsoft Micro Assembler (MASM) 6.15.

SYSTEM REQUIREMENTS:

- 1) 16-Bit (x86)
- 2) 32-Bit (x86)

HARDWARE REQUIREMENT

Computer that has a 1.6 GHz or faster processor.

- 1) RAM
1 GB RAM for x86
2 GB RAM for x64
- 2) An additional 512 MB RAM if running in a Virtual machine.

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