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IOT BASED SMART DUSTBIN SYSTEM

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ABSTRACT

India is a developing country. As a developing nation with its growing economy, waste management becomes very crucial. In our country roughly 64 million tons of trash is produced which ranks 5th in global scenario. Now a days in many areas people throw garbage anywhere which causes a lot of litter which further leads to serious health issues and serious diseases which originate from the germs and bacteria from the trash. Thus proper planning and management of this waste becomes one of the most important issue that must be addressed. If managed properly we can curb the waste management problem and have a cleaner and healthier India. The main focus of this paper is on the monitoring of trash levels and tracking those garbage bins which are full and need to be flushed out immediately in those respective areas. In addition to that the data is sent into workstation for real time monitoring. After reaching maximum level of garbage in the dustbin the alerts are sent directly to the municipal corporation's garbage collector through GSM module. If in case any fire occurs in the dustbin due to any flammable object, it will get alert through buzzer so that nearby people will take required action. Also during rainfall when the moisture in the dustbin gets above a threshold value which triggers the growth of bacteria inside the bin, pesticide is automatically gets sprayed into the dustbin to stop the bacteria growth and reduce the foul smell caused by the garbage which causes inconvenience to people living nearby.

Keywords: waste management, GSM module, tracking garbage bins, real time monitoring

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I. INTRODUCTION

Internet Of Things is a concept of putting an idea on the hardware devices and connecting them to work by internet. With the help of IOT we can make those devices work automatically which required manual assistance before.IOT is a rising technology and has many applications across the world in various fields right from agricultural to educational fields. Some common applications of IOT include phones, washing machines, headphones etc. There are some specific IOT domains such as smart homes, smart cars, parking, retail shops, smart cities etc. Since IOT as a domain is under lot of research and development, automation of devices in many fields and of many devices can be implemented.

In our paper we are using IOT for development of a Smart Dustbin. In our day to day life we see that sometimes the garbage is spilled on roads out from the garbage bins which were not cleaned at appropriate time. This causes the growth of many diseases because of the growth of bacteria from the dustbins and during rainy season, this blocks the sanitary canals which results in the growth of mosquitoes and harmful bacteria. To prevent this and to clean the waste from dustbin at appropriate time with moisture detection and pesticide spraying and to avoid any fire hazard in the dustbin we present "IOT based smart dustbin system".

II. LITERATURE REVIEW

We have conducted a survey on topics related to smart dustbin. In the paper "Smart Dustbin" the current research shows this system detects the nearest obstacle from the bin and the distance of trash from the lid. One the distance of the user or nearest obstacle from the bin, the second one

being the distance of the trash from the lid. If both of the values are less than the threshold value, it results in the set of courses already programmed to set into motion. Another paper to which we have referred is "Smart E Dustbin" The proposed idea of using the IOT protocol for transmitting the dustbin status by using wireless mode. In this project the selected hardware is espresso chip for this purpose which is a node MCU EP866 platform . Esp8266 is newly launched platform used by many users. It works on 2.4 GHz band and hence is free. So it is very popular and also has power down mode which put esp8266 into power down when no Wi-Fi is available in range. Another paper has the title "Smart Dual Dustbin Model for Waste Management in Smart Cities" The model has two dustbins which will be kept at public places mostly. Dustbin A can be used but Dustbin B cannot be used until Dustbin A is full. Dustbin B can only be used once Dustbin A is full and then Dustbin A will not open until the waste is cleared in the Dustbin A. Whenever any dustbin is filled up, a message is sent to the concerned authority. This will avoid overflow of waste in the bin. Dustbins have automatically close and open feature depending on the presence of an obstacle. The Title "Smart Dustbin For Economic Growth" has the features which states the system assures the cleaning of dustbins soon when the garbage level reaches its maximum. If the dustbin is not cleaned in specific time, then the record is sent to the higher authority who can take appropriate action against the concerned contractor. This system also helps to monitor the fake reports and hence can reduce the corruption in the overall management system. This reduces the total number of trips of garbage collection vehicle.

III. ARCHITECTURE DIAGRAM

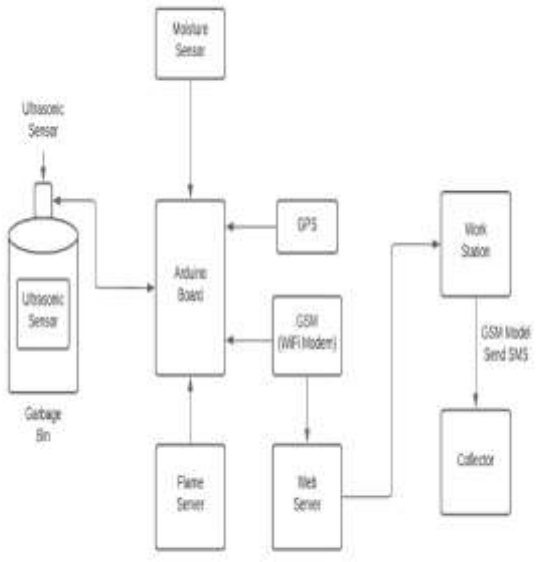

Fig 1. System architecture

IV. PROPOSED SYSTEM

This is IOT based smart dustbin system. This system is used for efficient waste management. In this system if any person wants to throw any trash in the dustbin, the dustbin lid is opened automatically using servo motor and ultrasonic sensor after trash is thrown in the dustbin, the dustbin lid gets closed automatically within few seconds.

It also determines the garbage level and immediately updates the same data on the workstation any person who is away from the dustbin can monitor the exact garbage level of the dustbin along with that, the dustbin also has LEDs which blink at empty, low, mid and full garbage levels and this data is also displayed on 16*2 character LCD display. When the garbage level in the dustbin is detected as full an alert message is sent to the authorities with Google map location so that the garbage collector can go to that particular location and flush out the garbage without any hussle.

In this system if any flammable object has been sensed by fire sensor due to human activities like cigars immediately an alarm will ring so that people can take immediate action. Also during rainfall when the moisture in the dustbin gets above a threshold value as detected by moisture sensor which triggers the growth of bacteria inside the bin, pesticide is automatically gets sprayed into the dustbin to stop the bacteria growth.

V. METHODOLOGY

The steps or modules for the functionality of the smart dustbin are:

1. Garbage bin lid opens automatically for any person standing in front of the bin to throw garbage.
2. The garbage bin lid closes automatically after the garbage is thrown.
3. Any presence of flammable object is detected and alarm rings if it is found.
4. Presence of excess moisture is detected and pesticide is sprayed if it is found.
5. The garbage level is checked.
6. The garbage level is indicated via the LEDs and 16*2 LCD.
7. The garbage level is updated on workstation.
8. If the garbage level is full alert message is sent along with bin's location.
9. After flushing trash again empty bin status is updated.

VI. CONCLUSION

In conclusion the waste of our country can be reduced up to maximum extent using this smart dustbin. It has a considerable future scope since waste management is becoming a major issue since India is the top 5th country in developing the waste about 1.8 million tons. So, one must take the proper measures for waste management and having a cleaner and healthier nation. Here in this system when the level of waste is above the threshold indicating the garbage bin is full, a message will be sent to Municipal Corporation by giving the exact location and this system also reduces the fire accidents from cigars etc. and prevents bacterial growth with moisture sensor and pesticide spraying function.

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