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Garbage and Street Light Monitoring System Using Internet of Things

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Abstract: Today we see the pictures of garbage bins being overfull and all the garbage spills out resulting in pollution. Hence our problem statement is to design a system based on any microcontroller for collecting the garbage from particular area whose public garbage bins are overflowing with prior concern. We are using a concept of Internet of Things in this project. so, continuous monitoring of garbage bins will helps to keep environment clean and safe. This paper also includes Street light monitoring which avoids accidents during night. Hence this paper will help to reduce power consumption and manpower.

Keywords: load cell, GSM module, LDR. Lpc2138.

I. INTRODUCTION

Garbage Monitoring System:- Garbage may consists of the unwanted material left over from manufacturing process like industrial, commercial, mining or agricultural operations or from community and household activities. "Swachh Bharat Abhiyan" Prime Minister Narendra Modi's ambitious project to make India a clean country, aims to teach citizens to reduce and even clean their own waste. India generates about 60 million tonnes of trash every year. 10 million tonnes of garbage is generated in just the metropolitan cities like Delhi, Mumbai, Chennai, Hyderabad, Bangalore, and Kolkata.

This project is related to the "Smart City" and based on "Internet of Things" (IOT). So for smart lifestyle, cleanliness is needed, and cleanliness is begins with Garbage Bin. This project will helps to eradicate or minimize the garbage disposal problem.

Street Light Monitoring System:-Street light are the major requirement in today's life of transportation for safety purposes and avoiding accidents during night. Despite that, In today's busy life, no one bothers to switch it off/on when not required. This project gives solution to minimise power consumption and manpower. Street light monitoring requires LDR, sensors and microcontroller. In this paper, we have designed an automatic street light control system using a simple light dependant resistor (LDR). This automatic street light control system provides human safety, urban beautification, and road safety.

II.LITERATURE SURVEY

In this paper, dustbin is also designed to compress the garbage periodically thus preventing the unnecessary occupying of dustbin's space by light weighted but space occupying garbage particles like sponges, etc. But it requires more maintenance and it is not economical. [1]

In this paper, Zigbee and Global System for Mobile Communication (GSM) are the latest trends and are one of the best combination to be used in the project. But, the range of communication of the zigbee is almost 50 meters. So it is not convenient to use and it is not economical. [2]

In this paper, An efficient method to dispose this waste has been designed with Wireless Sensor Networks (WSN) using VANETs. IEEE 802.11p has been adopted and multicast routing has been proposed to be implemented in Garbage Collecting Vehicle's (GCV) On Board Units (OBU) for effective communication. This project is under working. But it is not economical. [3]

In this paper, a Camera will be placed at every garbage collection point along with load cell sensor at bottom of the garbage can. The camera will take continuous snapshots of the garbage can. A threshold level is set which compares the output of camera and load sensor .

The comparison is done with help of microcontroller. After analysing the image we get an idea about level of garbage in the can and from the load cell sensor we get to know weight of garbage. Accordingly information is processed that is controller checks if the threshold level is exceeded or not. This project is convenient use but it is not economically good. [4]

In this paper, efficiency of the street lighting system is increased by zigbee and sensors. Less energy consumption by the system is done by the zigbee and sensors. But the range of communication of the zigbee is almost 50 meters. So it is not convenient to use.[5]

III. DESCRIPTION

BLOCK DIAGRAM DESCRIPTION:

In garbage bin, load cell is placed at the bottom to sense the weight of the garbage. At one side of garbage bin; three IR sensors are placed at three different levels like level 1, level 2, level 3. 38MHz frequency generated by the 555 timer IC is given to the three IR sensors.

At the other side of the garbage bin, three TSOP1738 IC is used at three different levels like level 1, level 2, and level 3.which are used to receive the signal of 38MHz frequency from the signal transmitted by three IR sensors used at another side of the garbage bin.

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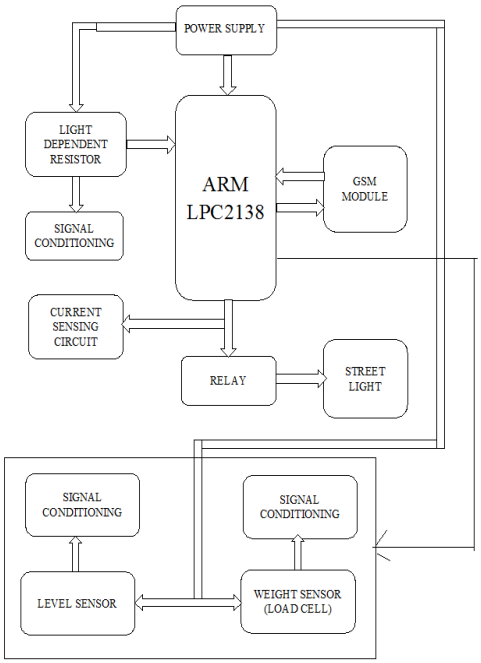


Fig. Garbage and street light monitoring system

If anyone through the garbage in garbage bin upto level 2 then signal transmitted from IR sensors at level 2 is not received by the TSOP1738 IC placed at level 2 of the other side of the garbage bin. load cell measures the weight of garbage through in the garbage bin. This all data is sends to the server with the help of lpc2138 and GSM module which are placed at the pole of street light. Also, message of garbage whether it is full or not is send to the driver of garbage carrier. Then, He will get all information of the area where garbage bin is full. After that, he will comes, and collect it. And GARBAGE BIN IS EMPTY, this message is send to the server of corporation office.

In automatic street light system, LDR is used. During the day, the LDR senses enough illumination and the street light goes OFF. And when darkness comes, resistance of the LDR increases tremendously and causes the light to come "ON'. Also, a transistor switching a 5V Relay is deplored to provide the switching mechanism to activate the street lights.

The need for manual operation of the street lights is completely eliminated and much energy is saved that would have been otherwise wasted if the user were to forget to power "OFF" the light at any point in time. This work was successfully designed, implemented and commissioned for use.

IV.HARDWARE USED

Microcontroller: It get information from sensor and process on it. It compares the received data with the threshold level set and accordingly output is generated. The LPC2131/32/34//38 microcontrollers are based on a 16/32-bit ARM7TDMI-S CPU with real-time emulation and embedded trace support, that combine the microcontroller with 32 kB, 64 kB, 128 kB, 256 kB and 512 kB of embedded high-speed flash memory.A128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at maximum clock rate.

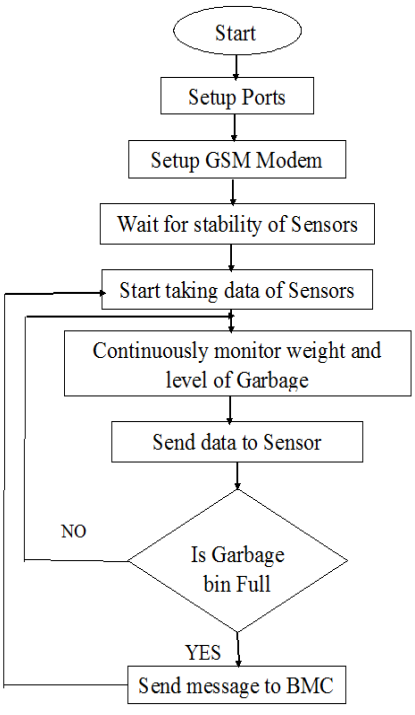
Power Supply: We use 12v power supply in our project. It is mainly used to provide DC voltage to the components on board. 3.3V for lpc2138 and 4.2v for Gsm module is apply from power supply. 5V is required for relay applied from power supply.

Load cell: Placed below the Garbage Can to sense the weight of garbage dump on it. The LOAD cell will continuously give the weight readings in voltage format, which is then given to a signal conditioning unit which amplifies the voltage and is then give to the µC. The µC then converts the analog signal to digital format. A load cell is a transducer that is used to sense and convert a force into an electrical signal. The output of the transducer can be scaled to calculate the force applied to the transducer. The various types of load cells are available, like include Hydraulic load cells sensor, Pneumatic load cells sensor and Strain gauge load cells sensor. We are use strain gauge lode cell in our project.

GSM Module: It is used to send message to the garbage depot if the Garbage Can exceeds the set threshold level. With the help of GSM module interfaced, we can send short text messages to the required municipal office. GSM module is provided by sim uses the mobile service provider and send sms to the respective authorities as per programmed. It operates at either the 900 MHz or 1800 MHz frequency band.

Light Dependent Resistor (LDR): A Light Dependent Resistor (aka LDR, photoconductor, photocell, or photo resistor.) is a device which has a resistance which varies according to the amount of light falling on its surface, when light falls upon it then the resistance changes. Light dependent resistors or LDRs are often used in circuits where it is necessary to detect the presence of light, or the ambient level of light, often to create a light triggered switch.

V. FLOWCHART



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VI. ADVANTAGES

1. It avoids soil contamination and air contamination.
2. It helps to keep clean and safe environment.
3. Many times garbage dustbin is overflown and many animals like dog or goat enters inside or near the dustbin. This creates a bad scene. Also some birds are also trying to take out garbage from dustbin
4. This project can avoid such situations.
5. Man power and power consumption of electricity is reduced by the automatic street light concept.

VII. APPLICATIONS

1. This project can also be used in the" SMART CITY".
2. This project is also helpful in the government project of "SWACHH BHARAT ABHIYAN".

VIII. CONCLUSION

By implementing this project we will avoid over flowing of garbage from the container in residential area which is previously either loaded manually or with the help of loaders in traditional trucks. Manual loading takes time and reduces the productivity of the vehicles and manpower deployed. Besides, manual handling of waste poses a threat to the health of the sanitation workers as the waste is highly contaminated. It can automatically monitor the street lighting equipment's (Lamps and controllers)

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