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SMART BIN

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ABSTRACT :

The main objective of this project is to maintain a clean environment everywhere. For this, a new system has developed to make the public places free from waste particles. In this work,a SMART BIN is designed with disposable and non-disposable areas. It collects the Solid Waste and it informs the status about the collected particles to the user through printed statement. The Printed statement contains some grade points to encourage the users to use the Smart bin .Once the SMART BIN is filled it sends Short Messaging Service(SMS) to the respective cleaning department by GSM module. The Infra-Red sensor (IR) is used to intimate the heater whenever a bottleor plastic particles are inserted into the non-disposable area of the smart bin.Then the heater unit will demolish the plastic dumped inside the bin. This Project is automated through embedded controller and easy to implement in all public places, and it encourages the people indirectly to use this model. At the same time public places are maintained cleanly.

Keywords—Weighing System, Sensing System, Communication Module, Printing System.

I. INTRODUCTION

Smart Bin operates to ensure efficient measurement of its status while consuming minimum energy.At present major cities around the world require challenging solutions for waste collection system, as a result of growth in public places and the economy. Furthermore, 85% of solid waste management funds are spent on waste collection and transportation. It becomes an excess wastage of resources when bins are collected that are filled up partially. In waste collection and carrying activities, the operational cost can be reduced by optimizing the quantity and deployment of collection bins and their collection rate. Estimating the status with waste level and weight of waste inside bins help to improve collection efficiency.

For a truly dynamic and automatic system, it is important to know the status of a bin rather than a prediction relays on historical fill level data, which arises question as ‘when will the bin beat enough fill level to stickup for collection?’.So to implement a Smart binwhich collects Solid waste and intimate the status about the dump to user and respected department via printer and the GSM techniques. This system uses Printer to convey the message through receipt about the status of dump feed by the user. In this receipt the bin management system would provide some

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grade points to encourage themselves for using it.

II. LITERATURE SURVEY

Intelligent solid waste bin is essential to develop and efficient and dynamic waste management system. This research presents the implementation and execution of an integrated sensing system and algorithm for solid waste bin to automate the solid waste collection process. Several sensing methods have been integrated and have combined their verdicts that offer the detection of bin condition and its parameter measurement. A number of test runs have been conducted to assess the functioning of the prototype system. The outcomes showed that the sensing system with the algorithm is efficient and intelligent andcan be simply used to automate any solid waste bin collection process.

Several researches have been done over the last few decades concerning solid waste monitoring and management. But a few of them dealt with real time bin status data with a motive to implement dynamicscheduling and routing approach for an automatic solid waste collection system. The system can capture the image when the waste collection vehicle reached in the vicinity of the bin. As the control center does not get the real time bin status data, it depends on the historical data for thecollection route. The researchers developed a bin by using several types of sensor like light-emitting diode (LED), camera, ultrasonic, pressure etc. for early detection of the bin status. But the system cannot respondinstantly when waste is thrown inside the bin. The author reports the system that have not sufficient information aboutthe bin level measurement techniques and the dynamicity.

III. PROPOSED SYSTEM

This project is an efficient way to collect Solid waste and intimate the status about the dump to user and respected department via printer and the GSM techniques. Communication between bin and respected team communication has done by GSM module by sending an SMS. This system uses Printer to convey the message through receipt about the status of dump feed by the user. In this receipt the bin management system would provide some grade points to encourage themselves for using it. The IR transmitter and receiver to intimate whenever a bottle inserted into the non disposable area of the waste bin then the heater unit will demolish the plastic dump inside the bin. This Project is a Fully automated through Embedded controller and easy to implement in all public places.

IV. IMPLEMENTATION

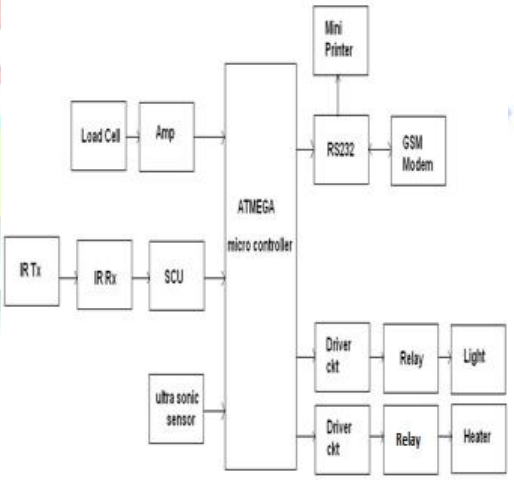

Fig1.Block diagram of Smart Bin

a) ATMEGA32A Microcontroller

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The main function of the CPU core is to ensure correct program execution. The CPU must therefore be able to access memories, perform calculations, control peripherals, and handle interrupts.In order to maximize performance and parallelism, the AVR uses Harvard architecture – with separate memories and buses for program and data. Instructions in the Program memory are executed with a single level pipelining. While one instruction is being executed, the next instruction is pre-fetched from the Program memory. This concept enables instructions to be executed in every clock cycle. The Program memory is In-System Reprogrammable Flash memory.

b) Weighing System

In this project an embedded controller which controls the components interfaced with it. The controller will work belong to the code written into the program memory. A Load cell is used to measure the total quantity of the waste dumped in the bin.A load cell is typically an electronic device (transducer) that is used to convert a force into an electrical signal.

This conversion is indirect and happens in two stages. Through a mechanical arrangement, the force being sensed deforms a strain gauge. The strain gauge converts the deformation (strain) to electrical signals. Normally, a load cell consists of four strain gauges in a Wheatstone bridge configuration, but is also available with one or two strain gauges.

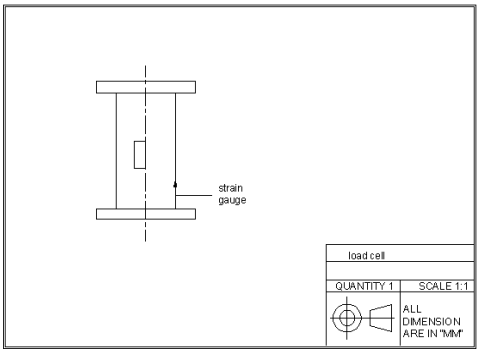

Fig2. Load cell

c) Sensing System

An ultrasonic sensor which used to measure the distance inside the bin by triggering an ultrasonic wave. Meanwhile the triggered wave is captured by ultrasonic receiver. Then the distance could calculate by mean time difference between triggered pulse and received pulse. Whenever the bin reaches the maximum limit it will be intimate through bulb driven by electric relay.

Fig3. Ultrasonic sensor

d) Heater Unit

The IR component of the Structure will use the line of sight interruption between IR transmitter and receiver to intimate whenever a bottle inserted into the bin unit, then the heater is placed at the non-disposable area of

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the Smart Bin, which will demolish the plastic dump inside the bin.

Fig4. Heating coils

e) Printing System

The purpose of mini printer which connected to RS232 Protocol is used to convey the message through receipt about the status of dump feed by the user. In this receipt the Smart Bin system would provide some grade points to encourage themselves for using it.

f) Communication Module

At finally overloaded bin have to intimate condition about cleaning to their corresponding department. The communication between bin and respected team communication has done by GSM module. The GSM module have connected by serial communication port of the controller and it send SMS through it.

Fig5. GSM Modem

V. CONCLUSION

This work is a unique effort which incorporates communication module, and weighing methodologiesrespectively. The integrated Smart bin system is designed to offer a proficient and automatic bin status monitoring system. The crucial point is the controller which synthesizes its weighing system, printing system and communication module. The functioning of the system is assessed by a number of tests run. These systems have led to an intelligent bin which is very efficient for automatic solid waste collection.

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