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A New Approach for Biomedical Waste Management

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ABSTRACT
The abstract should summarize the content of the paper. In the present situation, biomedical waste is a big problem. When the number of hospitals and health-care facilities grows, so does the amount of biomedical waste generated. With the increase of medical care, the amount of biomedical waste produced every day is growing. And different types of waste are managed differently (reused, recycled, and reduced), Not just that, but poorly disposed waste can be detrimental to the atmosphere as well as poisonous to those who come into contact with it when disposing or handling medical waste. Thus we are developing the automatically open color coded dustbin and when the dustbin is full at that time buzzer will get the sound moreover using the GSM module to transmit a message to the hospital management system updating the dustbin status

Keywords *– Biomedical waste, Color coded dustbin, Ultrasonic distance sensor, Servo motor, GSM module.*

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I. INTRODUCTION

For Biomedical waste is a form of unnecessary substance that can be dangerous to the atmosphere and to the individual who manages it. It's also known as hospital waste, because it's made up of both solid and liquid waste. Biomedical waste is any waste produced outside of a hospital during analytical, surgical, or diagnostic operations that is harmful to the atmosphere or has the potential to spread infection. This waste is distinct from that generated by households and businesses. As a result, they must be handled and controlled differently. Due to a rise in biomedical waste mismanagement in India, the Ministry of Environment and Forests of the Government of India has formalized the Biomedical Waste Management Act. These rules and regulations were adapted to manage the hospital waste effectively. Needles, blades, surgical cottons, gloves, bandages, discarded medication and body fluids, human tissues and organs, chemicals, and other items are among the wastes produced in the health-care procedure. Other wastes generated in healthcare settings include radioactive wastes, mercury containing instruments, PVC plastics etc., These are the most environmentally sensitive healthcare by products and needs a greater attention which has to be monitored.In present situation prevalence of communicable diseases has risen, and a viral outbreak known as Corona Virus (COVID-19) recently sparked a pandemic, requiring everybody to wear masks, gloves, and sanitise them regularly.. According to this, if we discard this much biomedical waste on a daily basis, 78.5 tonnes of hospital waste would be produced every day by the year 2019. A substantial majority of hospital waste is general waste, with a lesser portion of toxic waste. One or more factors can contribute to the dangerous nature of hospital health-care waste. The biggest issue with today's waste management scheme in most Indian hospital is the quality of the dustbins. In this paper, we attempted to improve a specific but critical aspect of medical waste management System.BMW is divided into several divisions, each with its own set of disposal options. These groups are mentioned below.

Table-I Color coded dustbins and their waste classification

YELLOW	RED	WHITE	BLUE
Infectious waste, Bandages, cotton contact with body fluids, etc.	Plastic waste such as catheters, Syringes, tubing, bottles.	Needles, blades, Sharps, All metal Articles.	Glass Bottles and broken glass, Metallic Body Implants.

II. METHODOLOGY

The segregation of biomedical waste is essential before disposing it off properly. We propose to develop a device which helps in segregation as well as disposing medical waste with

least human contact. The device is manufactured using different electrical components combined, such as: Arduino Uno, Ultrasonic sensor, and Servo motor, GSM module, Buzzer.

1.Ultrasonic sensor:

Ultrasonic sensors, as the name implies it uses ultrasonic waves to measure time. The sensor head sends out an ultrasonic pulse, which is transmitted back to it. Intended recipient Ultrasonic sensors are used to determine the distance between two points. Target by calculating the time between emission and detection an encourage. An optical sensor has both a transmitter and a receiver. In an ultrasonic sensor that emits and receives Frequency a single ultrasonic element is used for both purposes. A single oscillator conducts and absorbs ultrasonic signals in the sensor.

2.Servo Motor :

Servo motor is electromechanical device which converts electrical energy to mechanical Energy. Rotational movements can be used to rotate to move the object in any plane. We are using servo motor here to get output in Nonlinear form. We are using servo motor here angle of 0° to 90°.

3.Microcontroller (Arduino Uno) :

Arduino is Open-source electronics platform with basic hardware and software. while giving and taking commands for their controlled functioning . The Arduino programming language, and the Arduino Software (IDE), based on Processing. We are using Arduino uno board the controlling a servo motor and Ultrasonic sensor.

4. GSM Module:

GSM is a Global System for Mobile communications. GSM is an open digital cellular technology used for transmitting massages. GSM differs from first-generation wireless devices in that it utilizes automated hardware and delivery mechanisms known as Time Division Multiple Access (TDMA). GSM module using the sending the massage to hospital waste management system.
The device consists of mainly 4 blocks as shown figure -2 of block diagram. Like a Ultrasonic sensor, servo motor, Arduino Uno, Buzzer, GSM module.

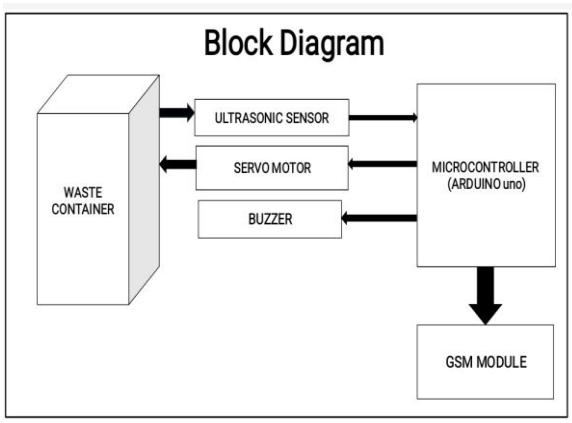
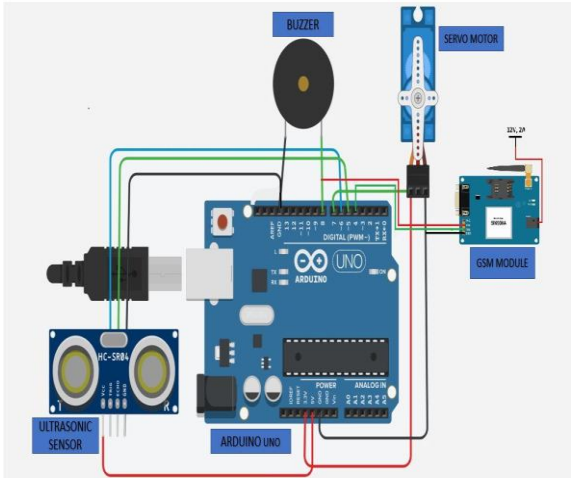


Figure 1: Block Diagram of Proposed System

As shown in a block diagram first is a ultrasonic sensor detects the environmental changes for human and after this signal passes through the Arduino Uno board. Servo motor this electrical signal to convert to mechanical signal means the dustbin lid open and shut as per given time period.

We have made a dustbin which is advance and smart. The Ultrasonics sensor and microcontroller is connected with the motor which is located on lid of the Dustbin. By the Ultrasonics sensor, the circuit will identify the amount of distance of the person. As soon as the person come closer to the Dustbin then the lid of the Dustbin will get open through the Servo motor by Arduino UNO. When the Dustbin gets full it will give the information through the GSM module to the hospital management. So, within a short time the Dustbin gets empty. By the opening the lid of the Dustbin automatically will reduce the chances of human contact. Moreover, by the GSM module and buzzer will updated the Dustbin is full or not. This is how the waste will dispose with less human contact. And also we will know easily that the Dustbin is full.



III. RESULTS AND DISCUSSION

The distance sensor circuit which is mounted into the Dustbin which detect the human and open the lid via servo motor. The distance sensor circuit will sense the object coming nearer or going far and according it will control the movement of the dustbin lid. When the dustbin gets full the massage will deliver to hospital management through the GSM module and will notify by the buzzer. Hence, without opening and closing the dustbin lid we can dispose the waste and will know the dustbin is full.

IV. CONCLUSION

Biomedical waste is unnecessary substance that can be dangerous for the environment and also for them who are managing the biomedical waste. Nowadays, the increasing disposal of biomedical waste essential to stop community spread of coronavirus. Thus, our device will help to dispose the waste with less human contact and will also notify when the dustbin will full. So, we know that we have to dispose the waste into dustbin or not. Also it will get empty as soon as possible when the massage will delivered to hospital management.

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