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Segregation and Treatment ofOrganic and Inorganic Waste

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Abstract: ***The problems of waste management and treatment has become a serious issue of concern to many scholars in environmental studies. This project critically examines the proper segregation and treatment of the organic waste. Due to the unscientific usage in the treatment of the waste, leads to the loss of the natural resources. Due to this the cost of the product increases without the proper utilization of the recyclable waste. In this project, segregation of the waste is carried out at the source stage. It can be classified into organic and inorganic waste. After the collection of the waste, proper scientific and recyclable methods are used to obtaina useful product from the waste which would be profitable.***

Keywords: Automated Waste Segregation, GSM, Organic and Inorganic, Footpath, Arduino Uno, Treatment, Transmitter (Tx), Receiver (Rx), Arduino C programming.

I. INTRODUCTION

Waste management is all those activities and action required to manage waste from its inception to its final disposal. It includes amongst other like collection, transport, treatment and disposal of waste together with monitoring and regulation. Waste is an unwanted or useless materials. It includes solid waste, liquid waste, e-waste, radioactive waste, medical waste, industrial waste, agricultural waste. Having a proper wastemanagement can result in the availability of valuable materialsto reuse. Reducing, reusing and recycling the waste is important for the environment, but it can also be profitable. It decreases the amount of waste for disposal, saves space in landfills, reduces the pollution and conserves natural resource. The waste segregator reduces the garbage waste and ragpickers in the city.

II. METHODOLOGY

1) *Segregation:* The waste is dump into a box. The IR Sensor willdetect if the box is containing waste or not. If the box contains a waste, sends a signal to Arduino Uno to make Moisture sensoractive. This moisture sensor will be going to detect the type of waste such as organic or inorganic and sends signal to Arduino Uno. Arduino Uno gives signal to servo in which direction should it rotate to collect the waste in a dustbin. If the waste is organic the servo motor rotates in anti-clockwise direction of 90 degree and collect the waste in the dustbin or if it is inorganic the servo motor rotates in clockwise direction of 90 degree and collect the waste in the dustbin. After the collection of waste in its respective dustbin, the rotor is going to rotor going to cut the waste into small particles. The filling or overflow of the waste isgoing to detect, with the help of weight sensor. After the bin is filled it will transmit the message to the receiver end, that the bin is filled and ready for the treatment.
2) *Treatment:* Collected organic waste fed into bin/bedding. Placethe worms into bin. It takes 30-45 days to convert into manure.

III. BLOCK DIAGRAM

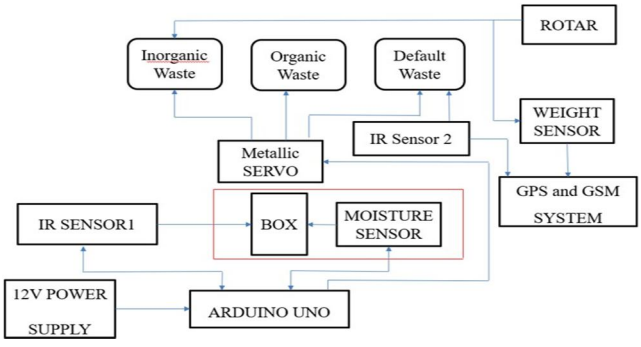


Fig.1.Block Diagram of Waste Segregation System

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In fig .1 shows that the waste segregation system at the source stage. It will segregate into organic and inorganic wastebased on the moisture content present in the waste. When the bin/box get filled, the IR sensor senses waste has been poured and activates moisture sensor. Moisture sensor has two cases if its value is very low it will give a signal to the servo to rotates 90 degree in clockwise direction, if its value is high shaft gets activated and rotates for if it is high shaft gets activated and servo rotates 90 degree anti-clockwise direction and collected inorganic waste bin. With the help of GPS and GSM system the user will get a message that the bin was full. The collected wasteis taken for the treatment process.

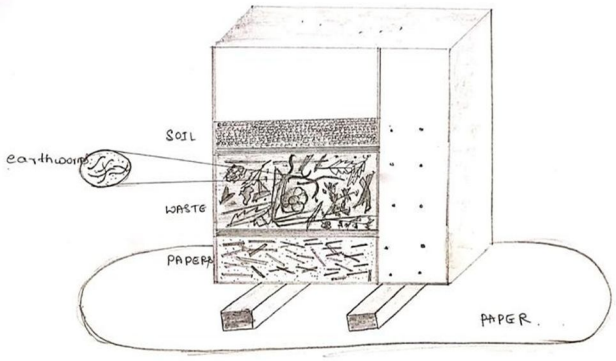


Fig.2. Treatment Process of Organic Waste

Fig.2 shows the treatment process of the organic waste in small scale. For the conversion of the organic waste into the manure, earthworms place a major role to enrich the nutrition value of the manure. It converts the organic waste into manureat the duration of 30-45 days.

IV. SOFTWARE AND HARDWARE REQUIREMENTS

1) ARDUINO IDE
2) ARDUINO UNO
3) MOISTURE SENSOR
4) IR SENSOR
5) WEIGHT SENSOR
6) GSM SYSTEM
7) METALLIC SERVO
8) ROTOR
9) POWER SUPPLY
10) JUMPER WIRES

V. RESULT AND DISCUSSION

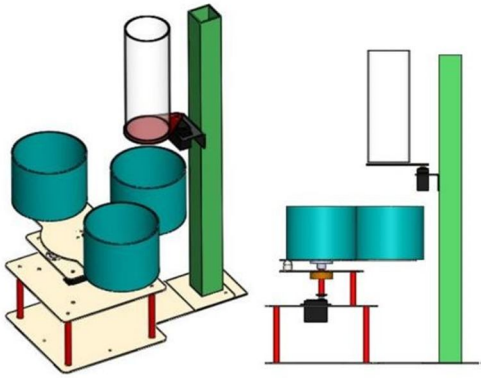


Fig.3. Top and Side view of Segregation System

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Fig.3 shows the 3D model of the mechanical structureof Segregation system which consisting of opening and closingof the lid where organic and inorganic waste is stored and bottom of the lid is connected to servo motor which can be seenin fig.3 and bottom part of structure is connected with rotating bins and it helps in collection of waste in particular bin which is going to be segregated with the help of IR and moisture sensor, these bins are connected with mechanical servo for collection of waste.

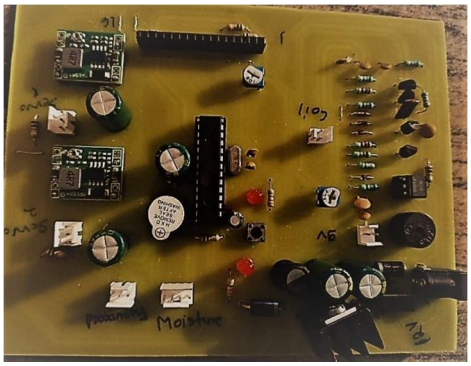


Fig.4. Motherboard

Fig.4. shows motherboard and consists of microprocessor ATmega328p which is programmed by Arduino IDE of Arduino C language which is connected with two servo, a optocoupler, a moisture sensor and a proximity sensor and an input jack for power supply which is connected with a switch.


Fig.5. Segregation of Organic Waste

In fig.5. shows that proximity sensor will first get detects the waste than, the waste is placed on to the lid with thehelp of rain sensor waste is going to segregate such as organic or inorganic. The waste is of organic which is presence of moisture content in the waste it is segregated as organic.


Fig.6. Segregation of Inorganic Waste

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In fig.6 shows that proximity sensor will first getdetects the waste than, the waste is placed on to the lid with thehelp of rain sensor waste is going to segregate such as organic or inorganic. The waste is of inorganic which has a presence ofmoisture content in the waste it is segregated as inorganic.



Fig.7. Dustbin

First step of treatment process is placing a bin in suitable environmental condition which can be seen in fig.7 where the bottom of the bins are drilled for the intake of oxygenfor fastening the processing of compost.



Fig.8. Paper Bed

In fig.8 shows the placing of paper bed as a protectivelayer for composting.



Fig.9. Collection of Earthworms

Fig.9 shows collection of Earthworms which fastens the decomposition processes and ensure clean composting.



Fig.10. Dumping of Organic Waste

Fig.10 shows the, dumping segregated organic waste into the bin after 30 days able to see the result of chemical freemanure.

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Fig.11. Manure

Fig.11 shows the manure obtained after 30 days of decompotion of treatment process.

VI. ADVANTAGES

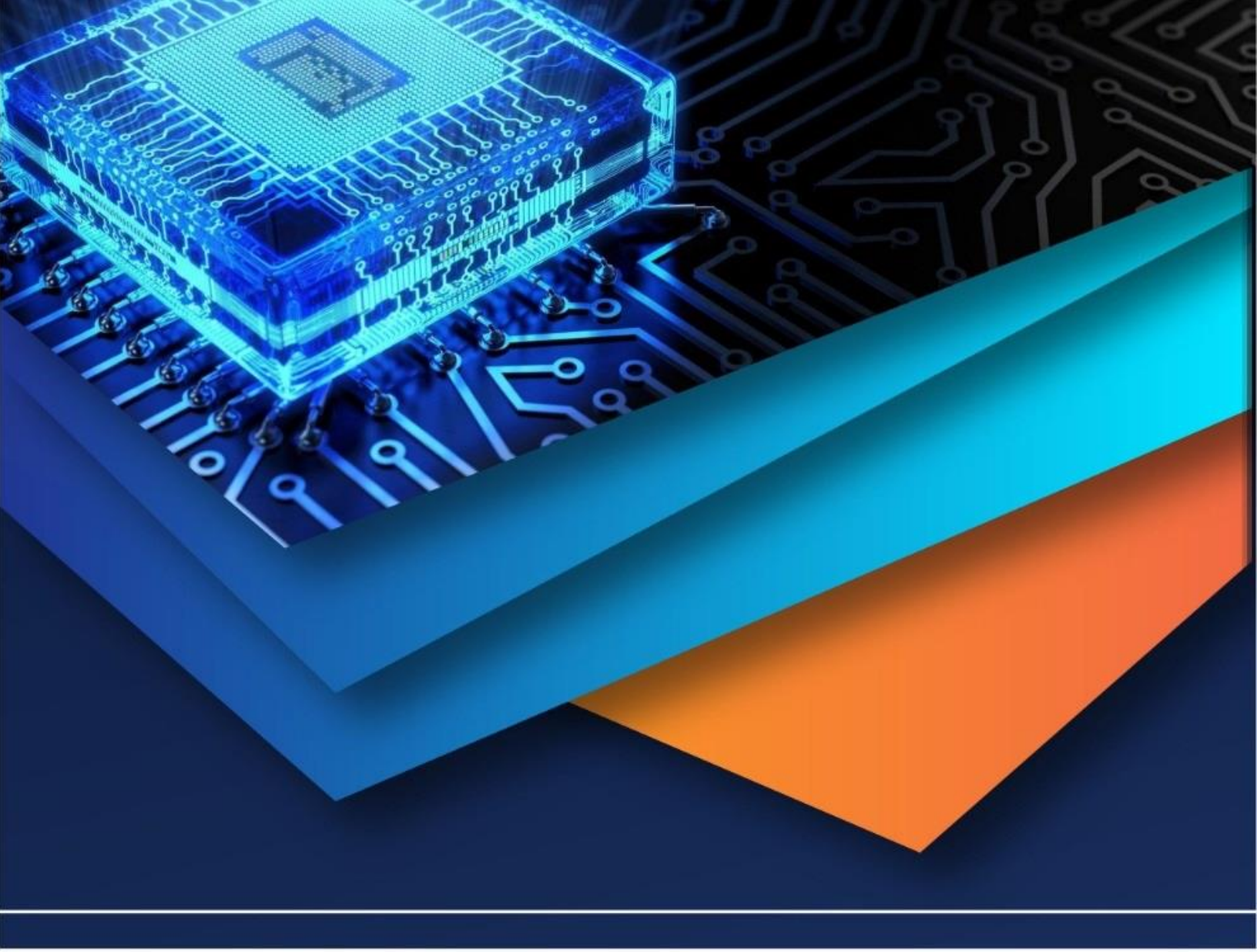
1) It can be implemented in every street.
2) It can segregate the waste easily.
3) It can be implemented in residential area.
4) Ecofriendly

VII. APPLICATIONS

1) Practice is highly lucrative.
2) Keeps the environment clean and fresh.
3) Saves the Earth and conserves energy.
4) Reduces environmental pollution.
5) Waste management will help to earn money

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