AUTOMATIC WASTE BIN

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Abstract : **Disposal of garbage has evolved into an enormous reason for distress in the community these days. The waste generated is disposed in the environment in a very huge amount which damage the atmosphere. The major origins are industrial and domestic wastes. As the people are not concentrating on the segregation of waste into there basic streams, causes the unrecognized of industrial waste. So , the very easy and cheapest solution for the segregation system is to make a use with the dust bin at small and medium companies which are send directly for processing. The metallic and non metallic waste is grouped through the design as mettalic, dry and wet wastes. The circuit is controlled by the use of the microcontroller.**

IndexTerms **- Arduino,Sensors,waste bin.**

I. INTRODUCTION

Collection,transportation and disposal of waste in India , are considered as unscientific and chaotic. So many health problem affects people due to dumping of waste outside the towns and cities and the over flowing of landfills. Many machines works for the division , segregation and recycling the waste in different methods like incineration. Urban solid waste recycling is due to the participation of the bag pickers for house hold waste. Various diseases like skin infections , respiratory problems, gastro troubles and other allergic disorders are the higher illness which affects the bag pickers and conservancy staffs in addition to the prevention of bites of dogs, rodents etc. The main aim of the paper is the segregation or illusion of waste. The three ways of separating waste is to dry , wet and metallic. The waste has a greater possibility to restore and so, recycled and re process. They are possible in metallic waste. In these days, the dumping of waste is a major cause for condemning in the whole world. An adverse effect on the environment is formed due to the disposal of huge amount of waste materials. The waste are mainly emerged as an industrial and domestic waste. This paper is mostly concentrated on the waste of industries on which the value is not at all recognised as the people don't spend time on the segregation of waste to their basic streams.
An easy and cheapest way to use for the separation system at small and medium sized companies or industries is executed by using a dust bin so that it can be directly send for the processing techniques. Metallic, dry and wet wastes are separated by the servo motor used in the bins placed at 180 degree from each other.

II. THEORY ANALYSIS

This system is mainly working with the help of 2 servo motors, sensors, a GSM module, Arduino mega. The sensors used in this system are IR sensor, proximity sensor, moisture sensor, ultrasonic sensors, etc. The functions of the sensors are the following.

IR sensors are used to sense materials that are going to the bin. It consists of both an IR transmitter and a receiver. Its operating voltage is 5V. Its detection range is from 5cm to 15cm. It senses the heat of an object as well as any motion in the surroundings.

An inductive proximity sensor is used for metal detecting. The working principle of a inductive proximity sensor is a coil and an oscillator that generates an electromagnetic field in the surrounding of the sensing range. Its operating voltage is 5V. Its sensing range is 5 to 3cms for ferrous-containing wastes and 1 to 1.5cms for non-ferrous-containing wastes.

A moisture sensor is used to detect wet waste. If the material has a moisture content above its dielectric permittivity, it will measure the value. Its working voltage is 5V.

Ultrasonic sensors are used to detect the level of waste in the dustbin. This measures the distance of a target object by emitting ultrasonic waves and receives the wave reflected from the target. Its operating voltage is 5V and its measuring distance is 2 to 450cm.

The function of the servo motor is to open the bin and also to rotate the bottom bins. The function of the GSM module is to send messages to workers when the bin is full.Arduino Mega is used for controlling the circuit.

III. MODE OF WORKING

When the waste falls on the bin, an IR sensor detects the waste and instructs the controller. When the material reaches the bottom of the first bin, there are sensors like proximity and moisture to detect the type of wastes. At that time the servo motor operates and opens the bottom of the first bin. The waste material will fall in the corresponding bins which are whether for metal, dry, or wet. (eg:-if the material is metal, the proximity sensor detects it and gives information to the controller. The controller instructs the servo motor to rotate that in a way that the material correctly falls on the bin assigned for metal.).

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IV. BLOCK DIAGRAM

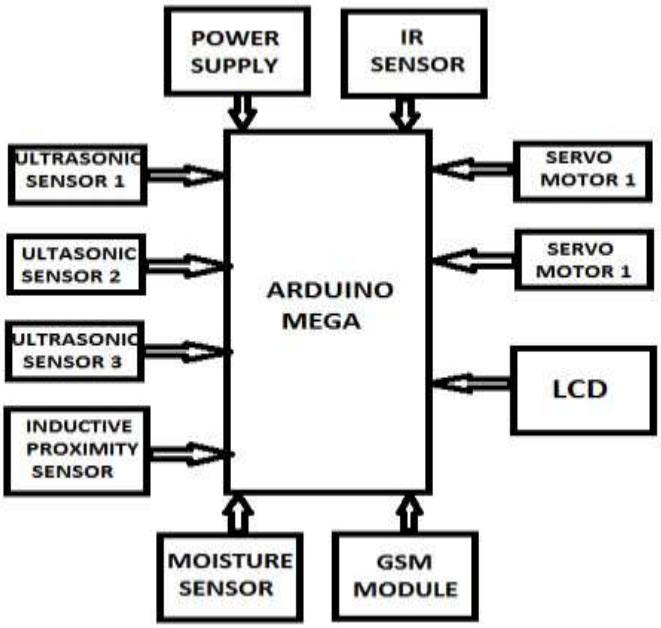

Fig 1.Block diagram

V. ELECTRIC MODEL

The circuit consists of Arduino Mega, LCD, two servo motors, proximity sensor, moisture sensor, three ultrasonic sensors, and an IR sensor.

Ultrasonic sensors have 4 pins. VCC, Ground, TRIG, and ECHO. VCC is connected to the 5V pin of the Arduino Mega. The trigger pin is connected to the PWM pin 9,7,6 respectively in the Arduino. The echo pin is connected to the pins A2, A5, A10 in the Arduino. Ground pin is connected to the ground pin of the Arduino.

Proximity sensors have 3 pins VCC, Ground, and output.VCC is connected to the 5V pin of the Arduino. The ground is connected to the ground pin. Output is connected to the A0.

The moisture sensor consists of 4 pins.VCC, ground, and output.VCC is connected to the 5V pin of the Arduino. Ground connected to the ground and either digital or analog pin is connected to the Arduino.

Servo motor consists of 3 pins. VCC, ground, and PWM pin. VCC is connected to the 5v of Arduino. The ground is connected to the ground. The PWM pin is connected to pin 13.

IR sensor consists of 3 pins. VCC, ground, digital D0.

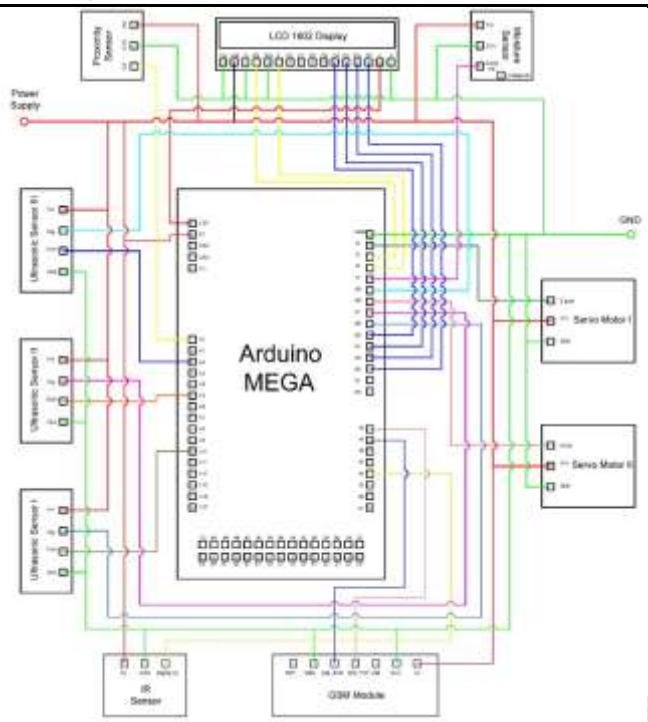

Fig 2.Circuit diagram

VI. SYSTEM MODEL

This system consists of a central pole about 1m long. The top of the pole a 4mm inlet basket is placed to throw the waste and it has a door in a round shape downward of the inlet basket and it consists of a servo motor to rotate the door in 180 degrees. After that three 4mm outlet baskets are placed in the leaf-like plate to collect the waste into different baskets. The plate is fixed to a servo motor to rotate the plate into 90 degrees, 180 degrees respectively for the collection of corresponding waste. Three ultrasonic sensors are placed 3 outlet baskets placed in the plate to detect the level of the waste in the bin and an LCD is there to show when the waste bin is full at the same time the GSM module sends the message to the corresponding section to take the waste from the basket.IR sensor is placed on the top basket placed in the top of the pole to detect the arrival of the waste. The proximity sensor and moisture sensor are placed in the door of the top basket. Another construction is for the balancing of the system and good looks.

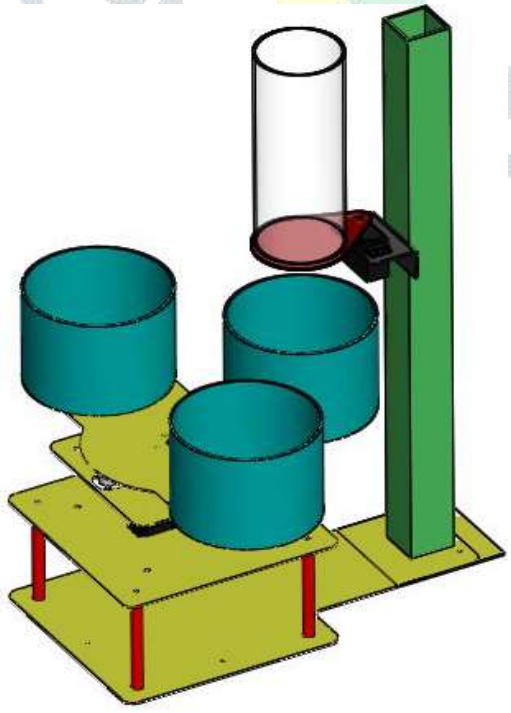

Fig 3.System model

VII. FLOW CHART

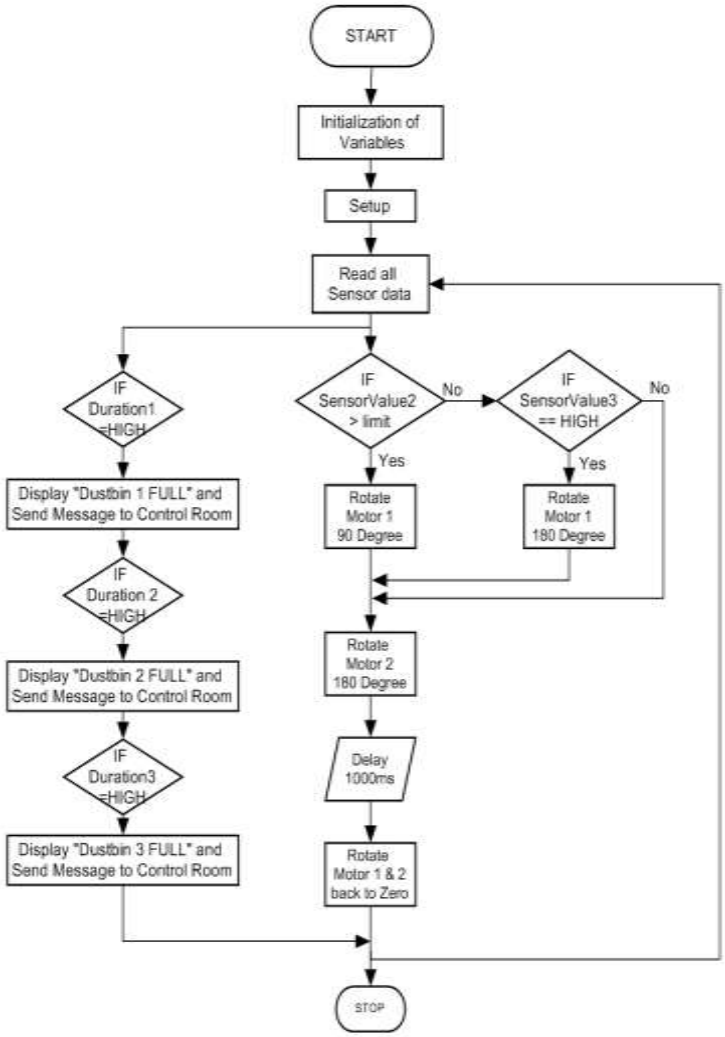

Fig 5.Flow chart

VIII. RESULT

Automatic waste system was thoroughly tested using different items that are usually disposed off on a regular basis. To test for effective segregation of wet waste,,wet tissue paper,,fruit peel were used. It was observed that the system was activated only after the waste was kept on the tray. Following a two second delay period, the material thrown by the user was correctly segregated into the wet basket.

Similarly, the dry waste segregation test condition was implemented using paper, foil, candy wrappers, cardboard and cartons. It was observed that the basket was activated only after the trash item was placed on the tray. After a delay of two seconds, the dry waste was accurately disposed off in the dry waste basket.

Similarly, the metal waste segregation test condition was implemented using iron, screws, metal parts, c. It was observed that the basket was activated only after the trash item was placed on the tray. After a delay of two seconds, the metal waste was accurately disposed off in the metal waste basket.

Upon filling the waste bins to 80% of their capacity, it was observed that the ultrasonic sensor detected the waste basket as almost full. At this stage, an SMS was sent to the user through the GSM module informing him or her that the waste baskets need to be cleared at the earliest.

IX. CONCLUSION

According to the second largest population in the world, India has large, amount of waste produced every day. There is production of 62 million tons of Municipal Solid Waste (MSW) each year in urban India. 70%. of which is collected and 20% gets treated. Because of the nature of different types of waste, it is very difficult to discard the waste. With evolution of technology in every field automated ways can be adopted to prevent the piling of garbage. The waste segregator is designed to provide ease in the disposal of waste that is Collected. Segregation plays a very important role by reducing the waste by reducing the waste by reusing.

Increase in requirement for efficient processing of the waste to maintain ecological balance the segregation of waste into wet, dry and mettallic categories can help in discarding the waste appropriately and in implementing the principle of reuse reduce and recycle. Thus the automatic waste segregator has a lot of applications

in the management of the waste. The system seperates the waste in three different bins under the category of wet, dry and mettallic. Different sensors are used for the detection of the types of waste. The level of the garbage in the bins are monitored continuously so that the bins dont overflow and they are empted timely.

The system model developed in this paper is efficient and durable since it is require less power for its operation and no human supervision.This efficiently reduces manpower, wastage of time and fuel required by the waste collecting vans. With the future scope bins can made solar powered with better segregation techniques like digital image processing and using a robotic arm used along a conveyor belt will make the process of segregation easier and also more sensors can be used to segregate bio degradable and non-bio degradable waste, plastic, recyclable waste e waste and medical waste. GSM module and GPS modules can be used. So that notification can send to the concerned authority with location by providing communication facilities.

X. **FUTURE SCOPE**

By using conveyer belt and vibrator we can use this system in industries as well as factories etc.and also we can implement GPS system and buzzer in this system for future.

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