WASTE SEGREGATION ROBOT

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Abstract: *Waste segregation is a process used for the sorting the waste product. Separation is necessary because if the waste is not sorted correctly, the waste gets mixed up in the soil and causes soil pollution. And with growing population of India the amount of waste generated is also increasing fastly. And hence it is a need of an efficient technique that can be used for segregating the waste material. Waste segregation robot is the technique by which we can segregate the waste material using a robot and thus minimize human interface. The robot picks up the similar type of waste material and dumps it in the trash bin. In this project ROBOT receives commands from the user. After that the gripper picks the waste material. The sensor used is metal proximity. The metal proximity sensors are used to sense the metal type waste material. As the sensors sense the waste material, ARM will drop the waste in proper section of bin.*

***Keywords*:** Robotic arm, metal proximity sensor, Fire Bird V.

Introduction:

Waste segregation and recycling are effective ways of reducing and reusing dumped waste. Unfortunately, in India these practices are not widely implemented. People have been inattentive when it comes to proper waste deposition, ignoring labels and throwing recyclables and reusable that can still be reused. Most of the people are unconcerned or neglect the fact that the waste sorting, recycling and reusing can reduce cost, reduce burden in our resources, and can produce lessen amount of waste be. Typical composition of garbage people throw in are 7% metals, 4% glass, 4% wood,16% plastic,3% yard trimming 39% paper and paper board,12% food, 5% rubber, leather and textiles and 10% others. In India, recycling centers' do physical process of segregating waste materials so it increases human interface as well as efforts. So, we implement a system which reduces human efforts in the waste collecting and separating process. Materials such as metals and non metals are the wastes that need to be segregated in this project.

Literature survey:

It contains the arm which picks similar type of objects and place them by reading the tags on them. They have used the RFID and image processing is used to scan the tags[1].
This was based on comparison technology. The android app was used to compare materials [2].
This system used to sort the objects according to their textures. Ultrasonic sensors were used to determine sensors [3].

System Components:

Fire Bird V Robot:

In the Fire Bird series of robots the Fire Bird V robot is the 5th. The First two versions of the Fire Bird robots were designed for the Embedded System Lab, Computer Science and Engineering department, IIT Bombay. These platforms were made commercially available from the third version. This version of the Fire Bird supports ATMEGA2560 (AVR), P89V51RD2 (8051) and LPC2148 (ARM7) microcontroller adaptor boards.

Fire Bird V(AVR)

Metal proximity sensor:

A proximity sensor can detect metallic objects without materialistic contact. It works on the principal of inductance. It consist of four components they are coil, oscillator, detection circuit and output circuit. When a metal object comes into the range of sensors detection, Eddy circuits build up in the metallic object, magnetically push back, which is used to reduce the Inductive sensors own oscillation field.

Metal Proximity Sensor

Robotic arm

A robotic arm which works similar to human hands. The robotic arm has two motors for motion one is used for gripping movement and another is used for ARM movement .The robotic arm is used for picking and placing the waste. The robotic arm works according to the commands given by user.

Robotic Arm

System working:

In this project AVR studio is used for coding purpose and AVR boot loader for embedding the program in the robot . The robot follows black line using white line sensor. The metal proximity sensor detects the type of waste material. After detecting, it decides whether the waste material is metallic or non-metallic, the gripper will pick the waste material and dumps it into the respective waste sections.

Conclusion:

The robot will be able to segregate the waste material on the basis of metal and non-metal. With the help of metal proximity sensor, the materials are dumped in the proper section.

References:

[1]SMART ROBOTIC ARM FOR AUTOMATIC SORTING OF OBJECTSWITH DIFFERENT TAGS N.I.Giannoccaro, L. Spedicato, A. Lay-Ekuakille
[2]Gowri Shankar M1, Aravindh V2, Deeban G2, Divakar T2 " Degradable and non degradable waste separation using pick and place robot."
[3]Saravana kannan G, Sasi kumar S, RagavanR,
Balakrishnan M "Automatic Garbage Separation Robot Using Image Processing Technique"