

“PDM Plastic Recycling Machine”

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Abstract: We know that plastic is a good friend of human being as it can be molded to any shapes as desired. The main problem found by us is difficulty in managing plastic pet bottles. The environment is littered by plastic wastes especially bottles and it causes pollution and health hazards. The use of plastic is increased now days in many industries like automobile, packaging, medical, etc. the reason behind this is that the plastic made things are quite easier to manufacture, handle and reliable to use. So the plastic good manufacturing industries are striving hard to produce good quality products at large scale and cheaper cost. We hope to make a product that can recycle plastic bottles from public disposal system. Either crushing or grinding the plastic for recycling.

Keywords: Arduino, plastic recycling, ATM, vending machine, GSM, microcontroller, RFID, etc.

I. Introduction

Used plastic bags, pieces of plastic sheets and bottles of diverse sizes, colours and textures are found flying around freely, scattered in the streets, swimming in the gutters, posing a serious environmental threat. These keep the environment dirty and cause blockages to our sewer system. Several attempts were made to discourage plastic bags and other plastic products but yield no result due to its versatility in daily use. Being cheap and easily available now it look like that we have to live up with it .recycling has been debated endlessly for many years now. There are two points of view regarding this issue. the argument in support of recycling concerns the negative impact of waste and emission on our planet. The counter case is that costs undertaken to recycle are larger than the revenue returns.

Large quantity of plastic waste is produced every year. Recycle process and reused of plastic waste products amount for vast manpower and huge processing cost resultantly very small amount of plastic waste is recycled and used and rest going into landfills, incinerators and dumps. the behaviour of concrete is studied under various combination of plasticwaste material with regard to effect on various concrete properties. Decreasing greenhouse gas emissions is also favourable to all for environmental reasons. The trend between the emission and the cost can be deducted. It will be a strong positive, linear correlation. The cost and the emissions can be kept low simultaneously using and increase recycle rate it is important to note that several assumptions were made in the calculation. Plastic recycling machine is a simple machine, compact, light weight. We can produce different types of domestic and industrial products by recycling the waste plastic.using compound dies we can produce components on scale and avoid the time consumption.This paper is based on the review of literature which gives the idea of utilizing various plastic waste materials in the concrete.

II. Operation

The operation of such machine is simple as that of an ATM machine. This is a machine equipped with an inlet to accept bottles. The inlet is opened for the operator to place the bottle in it. After the bottle is place inside the inlet, the inlet is closed, in inlet section there is an obstacle sensor is employed for sensing the bottle presence, if bottle gets detected by the sensor it sends the data to the microcontroller to turn on the crusher, and bottles gets crushed by using motorized crusher. Weight of crushed plastic measured by weighing system. It gives reward according to the weight of plastic. This machine is with a coin vending system so that it can gives a coin as reward. We also can linked this reward to transportation services inside the city by giving two reward options first one is cash and second one is deposit to my account. To credit this reward to the user for transfer the reward to his account. When we select second option credit to account for reward, machine ask for scan your ID, at this stage user need to scan his ID card. As he scanned his id, reward is instantly credited to the users account. The crushed plastic material is stored in removable container. After container getting full, machine sends a SMS alert to the nearest west collection depo. this is all processed by the Atmega328p controller operating in this machine. So the Atmega328p will helps this machine decide to accept the bottle for recycling or not. If the bottle is accepted then the microcontroller will dispense the coins at the outlet or ask user to deposite this reward to his account which can further used for daily transportation services. this project can be advantageous at various locations not limited to railway stations, bus stands or shopping malls. The huge

amount of plastic bottles wasted which is dumped on these public places can be easily collected if such a machine are installed at these places.

Algorithm Of State Machine Diagram:-

The algorithm state machine diagram consist two main states in which it receives returned item as an input. In the second step, sensor checks that containers are received or not? In the third step, it detects if plastic or not. If the sensor detects the plastic PET bottle then it gives a coin as an output.

Working of system:-

The amount of plastic produced daily and usage of such plastic materials is continuously harming the environment and is threat to the earth. The amount of bottles used in today’s word is too much and the recycling of such bottles is done in very less quantity. So to tackle such a huge problem by making the recycling procedure easy and profitable for a common man, we came up with this idea of smart machine for plastic waste disposal. The operation of such machine is simple as that of an ATM machine. This is a machine equipped with an inlet to accept bottles. The inlet is opened for the operator to place the bottle in it. After the bottle is place inside the inlet, the inlet is closed, in inlet section there is an obstacle sensor is employed for sensing the bottle presence, if bottle gets detected by the sensor it sends the data to the microcontroller to turn on the crusher, and bottles gets crushed by using motorized crusher. Weight of crushed plastic measured by weighing system. It gives reward according to the weight of plastic. This machine is with a coin vending system so that it can give a coin as reward. We also can linked this reward to transportation services inside the city by giving two reward options first one is cash and second one is deposit to my account. To credit this reward to the user for transfer the reward to his account. When we select second option credit to account for reward, machine ask for scan your ID, at this stage user need to scan his ID card. As he scanned his id, reward is instantly credited to the users account. The crushed plastic material is stored in removable container. After container getting full, machine sends a SMS alert to the nearest west collection depo. this is all processed by the Atmega328p controller operating in this machine. So the Atmega328p will helps this machine decide to accept the bottle for recycling or not. If the bottle is accepted then the microcontroller will dispense the coins at the outlet or ask user to deposited this reward to his account which can further used for daily transportation services.

Features:-

- 1) Plastic recycling is the process of recovering scrap or waste plastic and reprocessing the material into useful products.
- 2) When different types of plastics are melted together, they tend to phase-separated , like oil and water , and set in these layers.
- 3) PRET has been widely used to produce polyester fibres.
- 4) One use for this recycled PET is to create fabrics to be used in the clothing industry.

III. Literature Review

Today the plastic waste is one of the main problem of our society so waste management plays an important role. The littered plastic bottles cannot be collected effectively, so the dumping causes huge health problems. So we are here with a solution plastic recycling vending machine. In market similar kind of products are available but it has no proper detection system to detect the input is either plastic bottle or other kind of waste that damages the whole system. If a metal or glass material is put into the machine it will damage the crushing blades and makes the system a total failure.

The main components of the system is:

- 1) Arduino
- 2) Atmega328p
- 3) GSM Module
- 4) Ultrasonic level sensor
- 5) Crystal
- 6) Capacitors
- 7) Resistors
- 8) Diodes
- 9) LED
- 10) Servo motor

IV. Conclusion:

After deciding to create the plastic recycling machine, we had to decide what electronics to use and which sensors we would incorporate into it. After a lot of searching, we found an idea about the electronic circuits, the working structure and software components suitable for making the plastic recycling machine. Motivated by the problems due to health issues, we believed that the plastic recycling machine would be a good design and a good model to these problems. So the plastic recycling machine would need sensors to detect the plastic bottles, motor, claw, blades for crushing. This project has set out vision of making a clean environment free of littered plastic per bottles. The existing system has no detection technologies so we are planning to include the detection system in our project. In future we are planning to in co-operate the plastic as well as metal and glass bottles can be inserted in plastic recycling vending machine.

Waste materials are usually found littering all over the places in our urban cities and villages. Plastic recycling machine was therefore design and manufactured using locally sourced and available materials. The manufactured recycling machine was found to very useful in absorbing the huge waste in our country.

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