



Reward Generated by Smart Plastic Bottle Recycling Machine

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ABSTRACT

Target to the issue of plastic bottles recycling and reuse of wastage of plastic material, The system is necessary to develop to reduce the plastic garbage from environment. This system having main component ATmega 328P Which is main IC and GSM SIM 900A for communication purpose. This system not only collect the bottles but also generate the reward to attract more people to use this machine. The prototype model tests result shows already used plastic bottles & other plastic like plastic bags. LCD display displays instruction and keypad for easy usage of consumer for getting the reward code / cash back by entering the users cellpohne No. And further this code will be transfer to the users mobile no with the help of SMS. The collection of plastic bottles is mainly leads to reduce the pollution which is generated because of plastic waste as it is non decomposable material ,harmful to soil fertility ,water drains,choke the pipe lines and which is one of the major issue caused by drainage of plastic. In this way this system cash back by plastic waste is beneficial to the society .Overall the interesting rewards / promo codes options will attract the people. This collected scrap plastic will be further transfer for the recycling process , which is again reuse direct or indirect way.In this way the plastic recycling chain will be going on continue without harming to the Environmental health.

Keywords : Atmega328P, GSM module Microcontroller, Sensors.

I. INTRODUCTION

Cash Back By Plastic Recycling Machine is used for recycling of materials such as paper, bottles, cans, and plastic bags. This paper focuses specifically on reverse vending machine of plastic bottles. The purpose of reverse vending machine is purely to encourage recycling and provide an incentive for the user. The operation of this machine is very straight forward and simple.Users simply place their empty plastic bottles into the machine; the machine collects those plastic bottles and users put there contact number on keypad GSM module send the reward points on users contact number stated which is redeemable for cash. The

incentive can be of any type such as cash, reward points on smart cards, shopping coupons, bus/train tickets, mobile phone credit or donating to charity. This type of machines are widely used now-a-days;they are installed in hospitals, schools, universities, departmental stores, shopping malls and offices. They are widely used in countries like China, USA, Germany, Wales, Scotland, Ireland, Australia, Norway, Brazil, the Middle East and the UK. Bottles were detected using a sensor. This prototype enables the user to recycle plastic bottles and get cash rewards. An LDR sensor is used to recognize different bottle sizes, according to which the cash reward is calculated. This project will make machine cheaper

than most of the reverse vending machines. As the main objective of this project is to recycle and thus help protect the environment; this machine has to be as affordable and accessible as possible to have a positive impact on society.

II. PROPOSAL

As we can see, it has become easier to provide digital cash inputs. In the next few years, this trend will go up. Along with the ATM era, creating other features like banking, UPI and digital wallets is meant to save customers time, increase accuracy and make the system safer.

In today's age, the topic of water bottles and plastic bags is nothing new. If there is water, then plastic bottles will come! And bags are a necessity today. Humans produce about 2.5 plastic bottles every second. For this, its dissolution has become compulsory.

In addition to this, the government is also implementing new initiatives to curb this increasing pollution. As part of such an initiative, a small effort has been made to make this presentation.

III. METHODS AND MATERIAL

A. Block Diagram

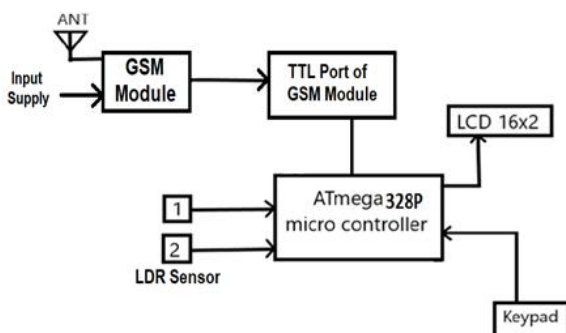


Fig 1. Block Diagram of Recycling Machine

B. Components Description

GSM module - A GSM/GPRS Module is an IC or chip that connects to the GSM Network using a SIM (Subscriber Identity Module) and Radio Waves. The common radio frequencies in which a typical GSM Module operates are 850MHz, 900MHz, 1800MHz and 1900MHz. GSM is a mobile communication modem; it stands for global system for mobile communication (GSM).

ATMEGA328P:- It is high performance, low power controller from Microchip. ATMEGA328P is an 8-bit microcontroller based on AVR RISC architecture. It is the most popular of all AVR controllers as it is used in ARDUINO boards.

LCD 16x2:- It is a 16 pin liquid crystal display. LCD 16x2 each character is displayed 5x7 pixel matrix.

IC7805:- Voltage regulator output voltage constant 5 volt value. IC 7805 member of 78xx series. Where the xx indicate the output voltage it provides.

LDR sensor:- An LDR is a component that has a (variable) resistance that changes with the light intensity that falls upon it. This allows them to be used in light sensing circuits.

C. Working

As shown in the fig. block diagram the 12V DC supply is given to GSM module with which antenna is connected for the signal.

Then from the TTL port of GSM the 5V from the Vcc pin is given to IC Atmega 328P for working.

Now, with IC Atmega many components are connected like keypad, LCD 16*2, LDR sensor 1 and 2 for different different operation.

GSM is used for sending the code by sms to the customer's mobile.

16*2 LCD is used for displaying purpose and keypad for entering the mobile number of users.

LDR sensor is use to detect the number of bottles enter in the container.

IV. System design

This section discusses the system modelling, process and theoretical design of the Smart Bottle Recycle Machine. It also describes the design flow which was used to implement the design.

A. Process diagram

The first block in the Block Diagram portrays the input of the system (Bottles), which is placed in the machine by the user. The second block portrays the mechanism of the sensor used, which detects and differentiates the bottles. The third block is the Bottle Counter, which takes an input from the sensor and counts the number of different types of bottles. The fourth block, the Points Counter, takes inputs from the previous block and provides the appropriate reward points. The fifth block, Binary to BCD converter, converts output from the binary values to BCD values to be displayed on the LCD and 7-segment display. The last two blocks, the 7-segment display and LCD, shows the height of the bottles and the calculated reward points for the user, respectively.

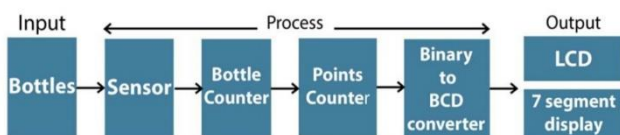


Fig. 1 Block diagram of Smart Bottle Recycling Machine design.

B. Physical Design

The design has two push buttons (see Fig. 2). One push button is used after each bottle is placed into the machine and the second button, the “done button”, is used when all the bottles from a user is placed into the machine. There is also a LCD mounted on the design which displays the final recycling value/incentive the user will receive. There is a two hole in the middle for the user to place the bottles &

plastic bags. The internal view of the design shows the LDR sensor mounted at the top. The plastic bottles are placed through the hole and fall at the bottom where the sensor detects them.

After detection of bottles the procedure of counting of bottles and sorting is to be done in the processor after all processing reward will be generated.

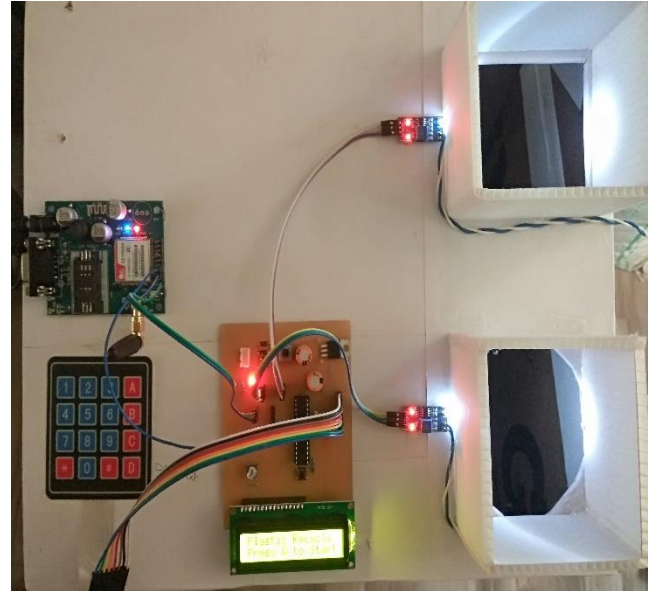


Fig.2 The prototype (top view)

V. RESULTS AND DISCUSSION

Plastic bottle recycling box is a creative design production based on microcontroller system. Application of embedding technology to waste treatment, not only broaden the technology’s application field, but also enhanced the technical level of waste treatment, more over meet people’s curiosity for new things, thus achieved the purpose of waste recycling. The experimental result shows the good effect of collector recycling and plastic treatment. Moreover, the recycling box improves the user’s participation, autonomy and interesting through onboard reward interactive interface, significantly reduces labor cost through the integration of network information auto management.

Recycling box with incentive mechanism, enhanced the refuse classification thinking, reinforced environmental protect awareness, provide a new idea for recycling waste and design corresponding innovation product.



Fig.3. The prototype (Front View)

VI. CONCLUSION

The prototype of the Smart Bottle Recycling Machine is successfully implemented and the whole system functions effectively. All the devices are working and functioning as expected and operates well with the designed circuit. The user inputs his/her bottles into the system, the system enables the summation of points throughout the recycling process and the LCD displays the number of each type of bottles and the total reward points. The reward points and number of bottles increment with every input to the system, using an LDR sensor, which is readily available in the market and very cost efficient.

I. FUTURE SCOPE

There is endless scope of research and improvement for the improvement for the cashback by plastic based reward generated machine.

However, in developing countries Reverse Vending Machine (RVM) are not very popular due to their high implementation and maintenance cost. Simply, they are not affordable and hence are not implemented. This project should work as a proof of concept for a low cost RVM in such cases. The remaining challenges and scopes of this work are:

- 1) Improved detection accuracy of the sensor system.
- 2) Sorting system for different materials .
- 3) Redemption of reward points.
- 4) Lower energy consumption.

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