

Introduction

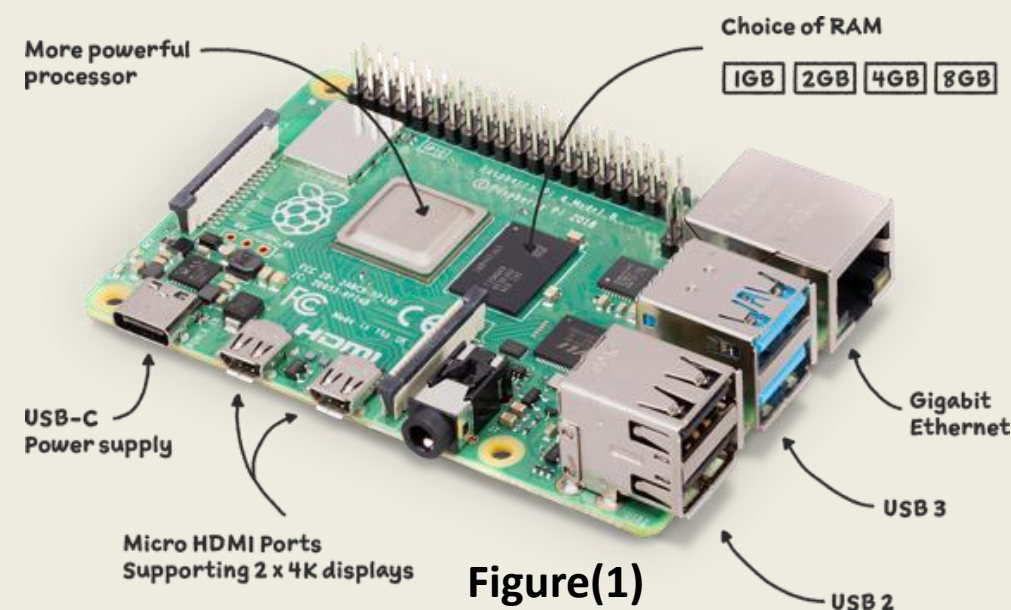
Reverse vending machines are automated machines that allow consumers to return empty beverage containers such as plastic bottles, cans, and glass bottles in exchange for cash or store credit. The purpose of reverse vending machines is to encourage recycling and reduce waste in the environment.

The aims of this project are:

- ❑ 1-To encourage recycling of beverage containers and reduce plastic waste in the environment.
- ❑ 2-To demonstrate the concept of a reverse vending machine using Raspberry Pi and simple hardware components.
- ❑ 3-To provide a basic functionality for the user to return and sort containers, without complex features such as payment or remote monitoring.

Methodology

A reverse vending machine (RVM) is a specialized type of vending machine that collects and recycles empty beverage containers, such as plastic bottles and aluminum cans. The Raspberry Pi (RPI) can be used in an RVM project to control and monitor the machine's functions.



Figure(1)

Control System Design

The design of the Reverse Vending Machine consists of two main parts: software and hardware design.

1 – The software Design

For programming the Python programming language is used. Python is a popular programming language for developing projects on the Raspberry Pi, including controlling a reverse vending machine. using a webcam in a reverse vending machine project can provide a range of benefits, including improved accuracy and efficiency of the recycling process, data collection and analysis, security monitoring, and user engagement.



Figur (2)



Figur (3)

1 – Hardware Design

The important part of the hardware system is the Raspberry Pi and the type of controller used here is Raspberry Pi 4 which is configured to control the operations of the Reverse Vending Machine.

Hardware Components are:

- 1 Webcam
- 2 – Servo Motors
- 3 – Display
- 4 – RFID Card Reader
- 5 – Power Supply 12 V
- 6 – DC Relays 24 V
- 7 – Floor LEDs
- 8 – Push Buttons
- 9 –Connecting Wires



Figure (4)

Figure (5) shows the block diagram of Raspberry Pi based Reverse Vending Machine.

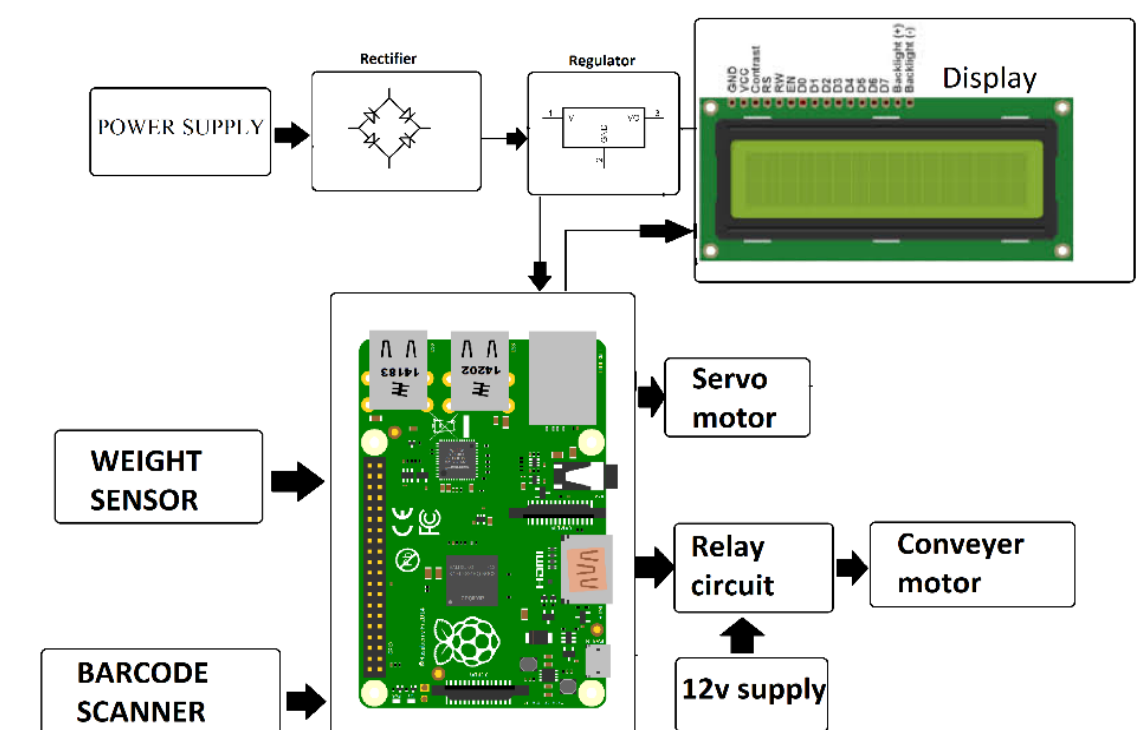


Figure (5)

Conclusion

the Reverse Vending Machine (RVM) project using Raspberry Pi, it can be concluded that this is a feasible and innovative project that has the potential to address important environmental issues.

By using a Raspberry Pi to control the RVM, the project can incorporate advanced features such as smart sensors and machine learning algorithms to improve the accuracy and efficiency of the recycling process. Additionally, the use of a Raspberry Pi allows for remote monitoring and control of the RVM, which can enhance its usability and accessibility.

References

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Prepared by :

Mohammed Hashim Ibrahim
Issam Saad Murad

Supervised by:

Dr. Mardin Abdullah Anwer