

Coin Operated Automatic Application Letter Dispensing Machine

Pravin Gauda¹, Archana Alli², Vishnupriya Kota³, Nirmity Patange⁴, Aarushi Bhadange⁵

¹Electrical Engineering Department & Shri Siddheshwar Women's Polytechnic, Solapur

²Electrical Engineering Department & Shri Siddheshwar Women's Polytechnic, Solapur

³Electrical Engineering Department & Shri Siddheshwar Women's Polytechnic, Solapur

⁴Electrical Engineering Department & Shri Siddheshwar Women's Polytechnic, Solapur

⁵Electrical Engineering Department & Shri Siddheshwar Women's Polytechnic, Solapur

Abstract - In many organizations and institutions, people frequently require application letters for various purposes. Manual availability of such letters depends on staff presence, which may not always be possible. To overcome this limitation, a Coin Operated Automatic Application Letter Dispensing Machine is proposed.

The system is designed to dispense an application letter automatically after inserting a valid coin. The machine operates without the need for human assistance and provides a simple and reliable method for obtaining an application letter. A coin detection unit is used to identify the coin, and once it is accepted, the control circuit activates the dispensing mechanism to release one application letter. The machine consists of a coin acceptor, control unit, motor-driven dispensing mechanism, and power supply. The overall operation is efficient, user-friendly, and suitable for installation in public and institutional environments. This project demonstrates the practical use of automation and basic control systems to reduce manual dependency and improve accessibility. The system is cost-effective, easy to operate, and helpful in situations where quick access to application letters is required.

Keywords: Paper vending machine, Coin Operated System, Automatic Vending Machine, Application Letter Dispensing, Microcontroller (ESP32 / Arduino), Coin Acceptor

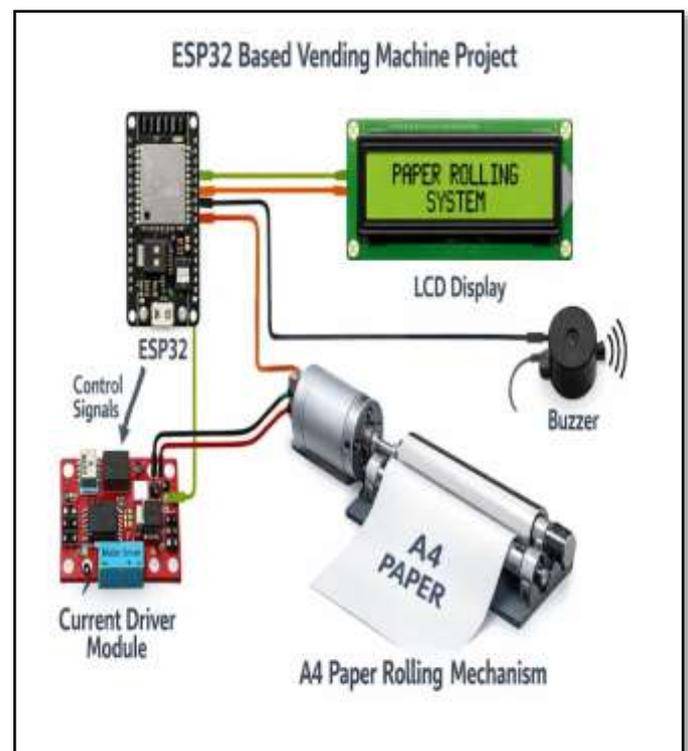
1. INTRODUCTION

In colleges, offices, and public places, people often need application letters for official purposes. Usually, they have to wait for staff or come back later if no one is available, which wastes time and causes inconvenience, especially in urgent situations. To solve this problem, we have designed a Coin Operated Automatic Application Letter Dispensing Machine, which provides application letters quickly and automatically. The machine works in

a simple way. First, the user inserts a coin into the machine, and the coin sensor checks whether it is valid. Once the coin is accepted, the control circuit activates the motor, which moves the mechanism to push one application letter out of the machine. After taking the letter, the machine is ready for the next user. This system works without the help of staff and is very easy to use. It saves time, reduces dependency on human resources, and provides a quick solution in situations where immediate access to application letters is required. The project demonstrates how simple automation using basic electrical and electronic components can make daily tasks easier, efficient, and reliable

2. WORKING

PRINCIPAL:



When a user inserts a coin into the slot, the coin moves along a defined path inside the coin acceptor. The coin is detected using sensors. Depending on the type of coin

acceptor, this can be a mechanical switch, optical sensor, or magnetic sensor. The sensor checks properties such as size, thickness, weight, and material to verify whether the coin is valid. Once the coin matches the preset criteria, the coin acceptor generates a valid signal (electrical pulse). This signal is sent to the control circuit of the machine. The control circuit then activates the motor-driven letter dispensing mechanism. If the coin does not match the criteria, the coin acceptor rejects the coin, and the machine remains idle the coin is detected using sensors. Depending on the type of coin acceptor, this can be a mechanical switch, optical sensor, or magnetic sensor. The sensor checks properties such as size, thickness, weight, and material to verify whether the coin is valid. Once the coin matches the preset criteria, the coin acceptor generates a valid signal (electrical pulse). This signal is sent to the control circuit of the machine. The control circuit then activates the motor-driven letter dispensing mechanism. If the coin does not match the criteria, the coin acceptor rejects the coin, and the machine remains idle. Dispensing mechanism.

ROLE IN THE SYSTEM:

Acts as a trigger device for the automatic operation of the machine. Ensures controlled and secure operation by allowing only valid coins to activate the system. Integrates easily with the control circuit for further automation processes.

Arduino ESP32 ,38 pins

Arduino (ESP32 ,38 pins) is an open-source microcontroller board that acts as the main control unit of the coin operated application letter dispensing machine. In this project, a 5V Arduino receives signals from the coin acceptor and controls the motor mechanism to dispense letters automatically. When a valid coin is detected, the Arduino processes the input signal and sends a command to the motor driver circuit to rotate the motor for a fixed time, pushing one application letter out of the machine. After completing the operation, the Arduino stops the motor and waits for the next valid coin signal. It ensures precise timing and coordination between input and output, allowing the machine to operate efficiently and reliably without human intervention. The Arduino 5V used in this system has 14 digital I/O pins, 6 analog input pins, and is based on the ATmega328P microcontroller, making it suitable for small automation projects like this machine.

3.METHODOLOGY:

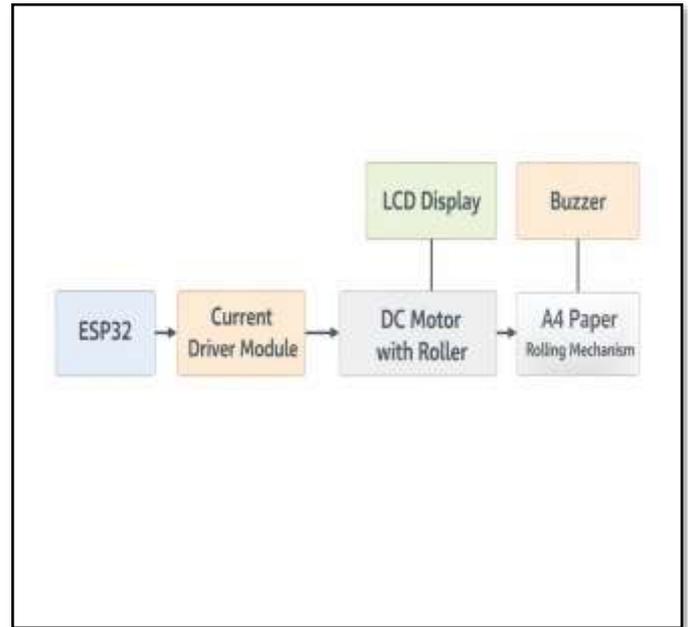


Figure1: Block diagram of

This block diagram illustrates the architecture of a system built around the ESP32-S2 microcontroller, likely for an automatic application vending machine project. The diagram focuses on the interaction between the main CPU and the Ultra Low Power (ULP) co-processor for monitoring and control functions.

Here is a breakdown of the diagram's components and their interactions:

Main Components: The core of the system is the ESP32-S2 chip, which contains a Main CPU and a ULP co-processor.

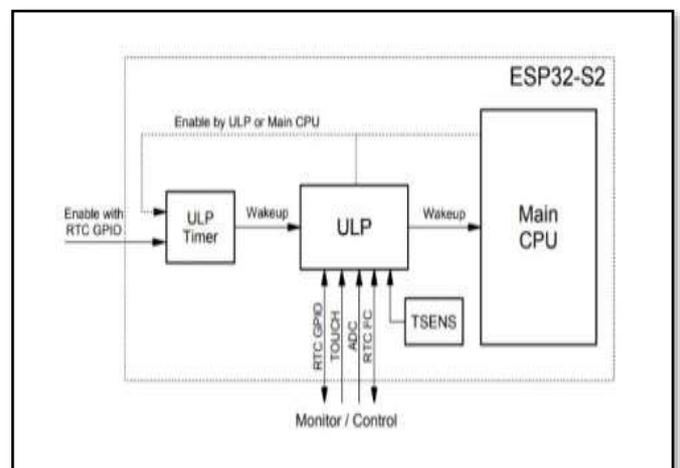


Fig -1: Figure

ULP Timer: The ULP Timer can wake up the

ULP co-processor. It is enabled by an RTC (Real-Time Clock) GPIO (General Purpose Input/Output) signal.

ULP Co-processor: The ULP can be enabled by either the ULP Timer or the Main CPU. It receives inputs from several sources:

RTC GPIO

TOUCH (touch sensor inputs)

ADC RTC FC (Analog-to-Digital Converter Real-Time Clock Function Controller)

TSENS (Temperature Sensor)

Monitor/Control: The ULP co-processor is responsible for "Monitor/Control" functions.

4. FUTURE SCOPE:

The Coin Operated Automatic Application Letter Dispensing Machine has good future potential as automation is increasing in public service systems. In the future, the machine can be upgraded with digital payment options such as UPI, debit cards, or QR codes instead of only coins. It can also be integrated with IoT technology for remote monitoring of paper stock and machine status. Advanced versions may provide multiple types of application forms, touchscreen interfaces, and online connectivity to print updated forms directly from institutional databases. The use of solar power and improved security systems can also make the machine more efficient and suitable for installation in schools, colleges, railway stations, and government offices.

5. CHALLENGES

Despite its advantages, the system also faces several challenges. Accurate coin detection and rejection of fake coins can be difficult to implement. Mechanical problems such as paper jamming and wear of moving parts may occur, requiring regular maintenance. Continuous power supply is needed for proper operation, and machines installed in public places may face risks of theft or vandalism. Additionally, the cost of installation and maintenance can be high, and frequent refilling of application forms is required in high-demand areas. Environmental conditions like dust and humidity may

also affect the performance of electronic and mechanical components.

6. CONCLUSIONS

The paper vending machine is a simple, low-cost, and user-friendly system designed to automate the distribution of A4 papers in colleges. By using an Arduino controller, coin acceptor, DC motor, and basic electronic components, the system reduces manual effort and saves time. It ensures controlled paper usage, improves efficiency, and promotes organized resource management. The project is economical, easy to implement, and suitable for real-time college applications such as leave forms and notices

7. ACKNOWLEDGEMENT

The authors would like to express their sincere gratitude to the project guide and faculty members for their continuous support, valuable guidance, and encouragement throughout the development of the project titled "Application Vending Machine." Their insights and suggestions greatly helped in improving the quality of this work.

8. REFERENCES

1. IEEE, *Finite State Machine Based Vending Machine Controller*, IEEE Conference Paper.
2. Sneha K. Gainwar et al., *Automatic Vending Machine*, International Journal for Research in Applied Science & Engineering Technology (IJRASET), 2022.
3. Susmita Jadhav et al., *Automatic Vending Machine*, International Journal of Innovative Science and Research Technology, 2018.
4. Prabhakaran M. N., *Coin Based Automatic Water Vending Machine*, International Journal of Engineering Research & Technology (IJERT), 2017.
5. Mary Sunitha et al., *Coin Counting Machine*, International Journal of Engineering Research & Technology (IJERT), 2016.