Seed Vending Machine

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Abstract- *The "Seed Vending Machine" project is an innovative and practical solution aimed at revolutionizing the seed distribution and farming industry. This project introduces a novel approach to seed dispensation, catering to the specific needs and challenges faced by modern farmers and urban gardeners. The proposed vending machine integrates cutting-edge technologies, including IoT (Internet of Things), to offer an automated, user-friendly, and customizable experience. By leveraging these advancements, the machine can dispense a wide variety of seeds in precise quantities, empowering users to select seeds tailored to their specific crop preferences and environmental conditions. Moreover, the machine employs data analytics to offer valuable insights on seed preferences, popular crop choices, and regional planting trends. This valuable data can aid seed suppliers in optimizing their offerings and provide farmers with relevant information to make informed planting decisions. Its technological prowess, combined with its user-oriented design, has the capacity to streamline the seed acquisition process, foster crop diversity, and ultimately contribute to food security and agricultural sustainability in both rural and urban settings*

Keywords- Cutting-edge Technologies, User-oriented Design and Seed Acquisition.

I. INTRODUCTION

At its core, this circuit comprises several key components. First, a microcontroller is employed to manage the entire system. It acts as the brain, receiving user input and controlling the DC motor's rotation. A user interface, typically through a keypad or touchscreen, allows customers to select the type and quantity of seeds they desire.

The DC motor is responsible for dispensing the seeds from the storage container. It is coupled with a mechanism that controls the seed release, ensuring accuracy in seed quantity. An optical sensor may also be integrated to detect when a seed packet is successfully dispensed.

Furthermore, the circuit includes safety features to prevent over-dispensing or jams, such as limit switches and error detection routines. The entire system is powered by a suitable power supply, and feedback mechanisms provide information to the user regarding the status of the vending process.

Step into a realm of sustainable agriculture and community bonding with the Modified Advanced Seed Vending Machine. This groundbreaking project seamlessly integrates technology and environmental consciousness, ushering in a new era of seed accessibility and cultivation. At its core, the machine employs intelligent algorithms to recommend the most suitable seeds based on local conditions, ensuring a successful gardening experience for users of all levels.

Its user-friendly interface simplifies the seed selection process, providing comprehensive information on planting and care. What sets this project apart is its commitment to environmental sustainability, utilizing eco-friendly materials, energy-efficient components, and promoting biodiversity through a diverse seed offering. Beyond a mere transactional device, the vending machine becomes a hub for community interaction, fostering connections between gardening enthusiasts who share tips, exchange seeds, and participate in workshops.

By empowering individuals to take control of their food sources and encouraging urban agriculture, the Modified Advanced Seed Vending Machine transcends its role as a dispenser of seeds, becoming a beacon for education, collaboration, and a greener, more interconnected future. Join us in cultivating tomorrow with this innovative approach to seed distribution.

II. PROBLEMIDENTIFICATION

- It's Inconsistent Seed Quality and Lack of Standardization.
- Inadequate Storage Facilities and Transportation Issues.
- Limited Availability of Diverse Varieties
- Unequal Access and Seasonal Variations.
- Seed Adulteration.
- Financial Constraints of Small-Scale Farmers and Consumers.

III. FIELD STUDY

The field study is expected to provide valuable insights into the real-world application of the Advanced Seed Vending Machine Project. It will enable us to identify areas for improvement, refine user experiences, and ensure the project's overall success. By gathering feedback from a diverse range of users and environments, we aim to make data-driven decisions that enhance the project's impact and sustainability.
The field study for the Advanced Seed Vending Machine Project is an integral part of the project's development and implementation process. This study aims to gather valuable insights and feedback by observing the real-world usage of the seed vending machines in various environments. The primary objectives are to assess user satisfaction, monitor machine functionality, and identify areas for improvement to ensure the success of the project.

- Selection of Study Locations:

The field study will take place in a diverse range of locations, including urban and rural settings, community gardens, schools, and recreational areas. This will provide a comprehensive understanding of the seed vending machine's adaptability and impact.

- User Experience:

We will assess how users interact with the machine, their level of satisfaction, and whether the educational features are helpful in aiding their gardening endeavors.

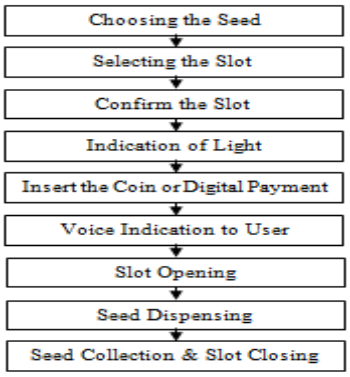
- Seed Varieties:

Evaluate the popularity of different seed varieties and whether users take advantage of the custom seed blend feature.

- Technical Performance:

Monitor the reliability of the vending machine's technical components, including payment processing, seed dispensing, and connectivity.

IV. WORKING METHODOLOGY



V. DESIGN

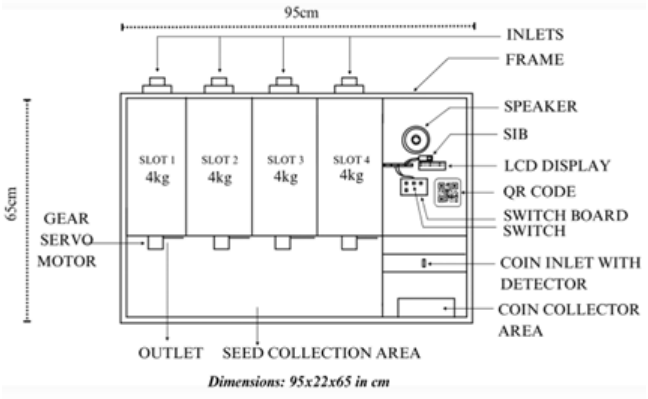


Figure: Design of Seed Vending Machine

VI. ELECTRICAL COMPONENTS

1) MG995 Gear Servo Motor.
1) Serial Interface Board.
2) Coin Detection Sensor.
3) Mini Speaker.
4) LCD Display.
5) Indication LED.

VII. FABRICATION PROCESS

The fabrication of a seed vending machine integrating wood, fiberglass, Arduino board, servomotor, LCD display, mini speaker, and a coin detection sensor involves a thoughtful combination of materials and electronic components to create a robust and user-friendly system.

1) Structural Framework

To commence the fabrication, the structural framework of the seed vending machine can be crafted using wood or fiberglass, depending on the project's requirements.

Wood, particularly plywood, offers a cost-effective and easily customizable solution, while fiberglass provides additional durability and weather resistance, making it suitable for outdoor deployment.

2) Electronic Integration with Arduino Board

The heart of the seed vending machine lies in the Arduino board, specifically the Arduino UNO R3, which serves as the central processing unit. The Arduino board interfaces with various components, including the servomotor, LCD display, mini speaker, and coin detection sensor. It processes input data and controls the output actions based on programmed instructions.

3) Dispensing Mechanism with Servomotor

The servomotor plays a crucial role in the dispensing mechanism of the seed vending machine. It can be connected to a dispenser or chute system that releases the seed packets upon successful transaction completion. The Arduino board coordinates with the servomotor to ensure precise and controlled dispensing, providing an efficient and reliable user experience.

4) User Interface with LCD Display

Integrating an LCD display into the vending machine facilitates a user-friendly interface. The LCD display can showcase available seed options, pricing information, and transaction details. The Arduino board communicates with the LCD display to update information in real-time, creating a dynamic and interactive experience for users.

Figure: Electronic Components

5) Auditory Feedback with Mini Speaker

A mini speaker adds an auditory dimension to the vending machine, providing feedback and alerts to users. It can be programmed to emit sound signals confirming successful transactions, prompting users to make a selection, or alerting in case of issues. The mini speaker enhances the overall user experience and contributes to the accessibility of the vending machine.

6) Coin Handling with Detection Sensor

To facilitate transactions, a coin detection sensor is incorporated into the vending machine. This sensor identifies and verifies the coins inserted by users, ensuring that the correct amount is received before initiating the seed dispensing process. The Arduino board interprets the sensor data, validating the transaction and triggering the necessary actions.

7) Power Supply

Ensure a reliable power supply to run the vending machine and its electronic components. Depending on the scale and location of deployment, a combination of batteries and/or a power adapter can be employed. In the fabrication process, considering both functionality and aesthetics by using sticker to make good appearance. Wiring and connections between the Arduino board and electronic components must be organized and secure. Thorough testing and troubleshooting are essential to ensure the seamless operation of the seed vending machine before deployment.

VIII. WORKING PRINCIPLE

Seed vending machines work on a straightforward principle:

- *Selection:* Users choose the type of seeds they want to purchase, which are available in different slots.
- *Confirmation: C*onfirm the slot selected by pressing the buttons. After confirmation, the LED will glow in that specific slot.
- *Payment:* Users insert coins or use cashless payment methods (Mobile payments) to pay for the selected seeds.
- *Payment Successful:* Once payment is Accepted, the voice notifies the "Payment completed successfully" through the speaker to the user.
- *Dispensing:* The machine dispenses the chosen seeds, and then the consumer collects the seeds using a container or bag.

Figure: Seed Vending Machine

IX. CONCLUSION

When the world is running rapidly with advancement, time is the undoubtedly the most crucial and vital resource of all. It becomes unpreventable to save time by all possible ways. This vending machine can offer variety of product. When a coin is inserted in the Vending machine the electromagnetic sensor senses the coin. After sensing, if the coin turns out to be suitable then the product gets released. And if an inappropriate coin is inserted, the coin comes out of the machine. The vending machine is capable of detecting any type of coin which can even be changed after modification of the coin acceptor. Thus, the desired output is achieved. The testing for fake currency has also been done so that possibility of frauds gets reduced. In the current time, digitalization is increasing speedily on a daily basis due to its accuracy and feasibility. Due to its time saving feature, vending machine can be installed and used in populated areas like market, fertilizer stores, agriculture input shops and etc. This machine is portable, affordable, requires less power and can be made easily available so that the user can use this system whenever and wherever. This system offers rapid response and is simple to use by common people. The designed system can be used for various applications and we can enhance the variety of selections. Thus, we attempted and tried our best to modify the present-day complicated vending machines into a user-friendly vending machine. This Machine can be further enhanced with more upgradation like digital payment and Token payment.

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