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# DEVELOPMENT OF A WOMAN CENTRIC IOT BASED SANITARY PAD DISPENSER FOR URBAN AND RURAL AREAS

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***Abstract :*** This paper presents the design of an Access to sanitary hygiene products remains a significant challenge, particularly in underserved rural and urban communities. This paper presents the design and development of an IoT-based sanitary pad dispenser that ensures affordable, accessible, and hygienic menstrual products for women. This dispenser employs an Arduino microcontroller integrated with an RFID smart card reader, stepper motor, LCD display, and sensors to ensure efficient dispensing. Real-time monitoring via IoT enables effective stock management and maintenance. This innovative solution promotes health equity, dignity, and ease of access in educational institutions, workplaces, and public settings.

***Index Terms*** **- IoT, Sanitary Pad Dispenser, Menstrual Hygiene, Arduino UNO, RFID, Public Health, Smart Card, Stepper Motor, Embedded Systems.**

## I. INTRODUCTION

Menstrual hygiene is a crucial aspect of women's health and dignity, yet access to sanitary products remains limited for many women in both urban slums and rural communities across India. Despite growing awareness, the social stigma and lack of infrastructure continue to hinder proper menstrual hygiene management (MHM). Women often feel uncomfortable or embarrassed purchasing sanitary pads from pharmacies, especially in public or male-dominated spaces, which can lead to neglect of essential hygiene practices.

To address these challenges, the integration of technology into healthcare delivery is gaining momentum. This paper introduces a **woman-centric IoT-based sanitary pad dispenser**, developed as a cost-effective, user-friendly, and hygienic alternative to traditional coin-operated or manually operated dispensers. The system uses an **Arduino UNO microcontroller**, an **RFID smart card reader**, a **stepper motor**, and a **16x2 LCD** to automate the dispensing process. Additionally, the integration of IoT allows for **real-time inventory monitoring**, enabling timely refills and maintenance.

By empowering women with discrete, cashless, and easy access to sanitary pads, the proposed solution aims to enhance their health, confidence, and quality of life. This initiative not only addresses the infrastructural gap but also promotes awareness and normalization of menstrual hygiene in society. The system is designed to be deployed in **schools, colleges, workplaces, bus terminals, and public restrooms**, ensuring maximum outreach and impact.

## II. LITERATURE SURVEY

Conventional sanitary pad vending machines are primarily coin-operated. These systems, while functional, are plagued by challenges such as mechanical malfunctions, limited coin compatibility, and vulnerability to tampering. Most lack real-time inventory tracking and require physical presence for maintenance. Additionally, these systems are often bulky and expensive due to reliance on high-capacity spring mechanisms, reducing their efficiency and accessibility in low-resource settings.

## III. PROPOSED SYSTEM

The proposed system is a smart, compact, and cost-effective sanitary pad dispenser that leverages RFID technology and IoT. It comprises an Arduino UNO microcontroller, RFID smart card reader for secure user authentication, and a stepper motor to dispense pads in a controlled manner. A 16x2 LCD displays system status, and a buzzer provides user feedback. The system transmits data to a centralized platform for inventory monitoring, ensuring timely refills. This solution overcomes the limitations of coin-based dispensers and introduces hygienic, contactless operation suitable for both urban and rural deployment.

## IV. WORKING

The system operates through an RFID-based authentication method, where users scan a smart card to initiate the dispensing process. Once the RFID reader verifies the user's card, it sends a signal to the Arduino Uno microcontroller. The Arduino then activates the stepper motor, which is mechanically linked to the dispensing mechanism. As the motor rotates, it dispenses one sanitary pad to the user. Throughout the process, a 16x2 LCD display provides real-time status updates such as instructions to scan the card, dispensing in progress, or out-of-stock messages. Additionally, a buzzer gives an audible signal confirming the successful dispensing of a pad. The system is powered through a regulated power supply to ensure smooth operation. By integrating IoT features, the dispenser can also transmit usage and stock data for remote monitoring, allowing authorities to restock pads timely. This project aims to overcome the limitations of traditional coin-operated dispensers by offering a hygienic, cashless, and user-friendly solution suitable for schools, colleges, offices, and public spaces.

## V. RESULTS

The smart card is scanned, and upon verification, the motor dispenses a sanitary pad while updating the display and notifying via the buzzer.

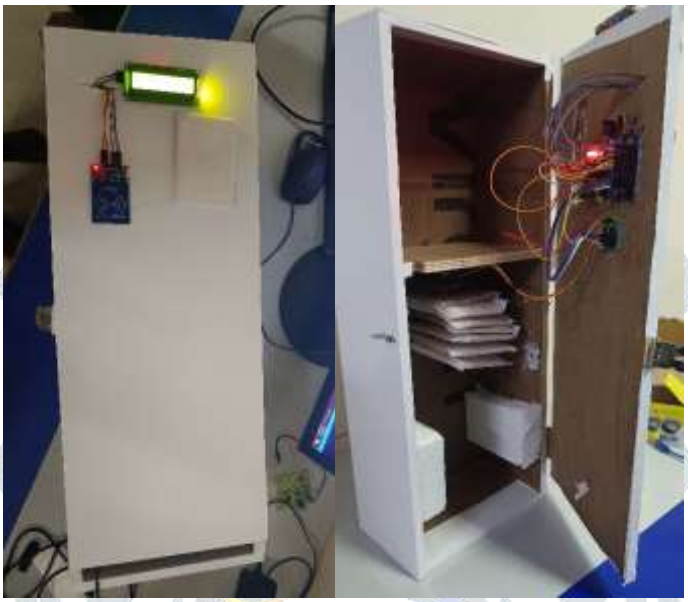

Figure 5.1: Working Model of Proposed System

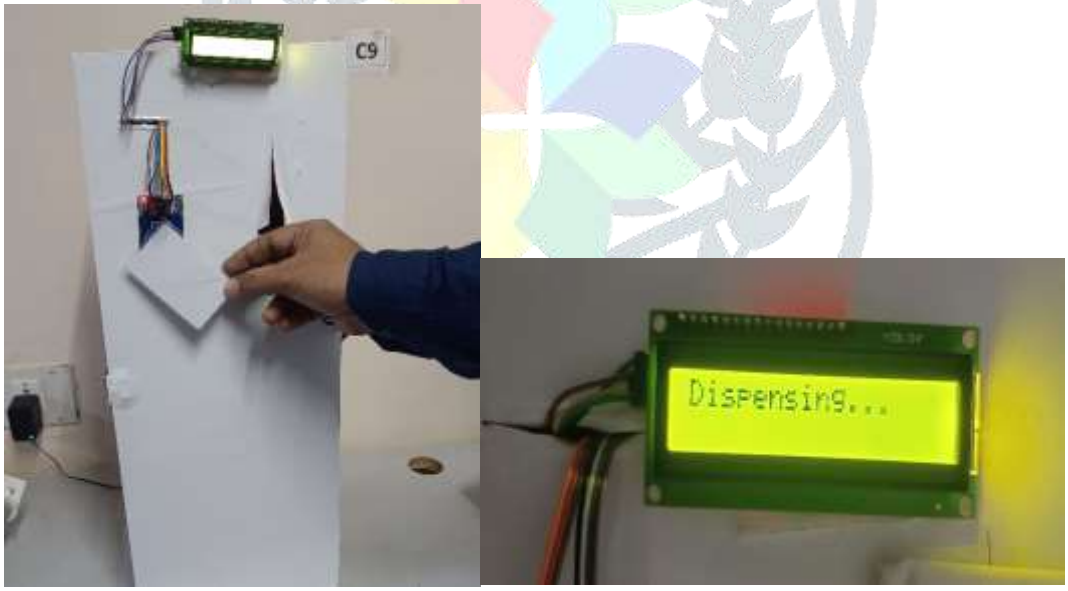


Figure 5.2: Smart Card Scan for Sanitary Pad

Figure 5.3: When the pad is dispensed


Figure 5.4: The status of empty slot displayed on LCD

### 5.1 APPLICATIONS:

- Contactless and hygienic.
- Supports digital payment via RFID smart cards.
- Real-time inventory tracking.
- Compact and scalable for various installations.

## VI. ACKNOWLEDGMENT

We would like to express our heartfelt gratitude to all those who supported and encouraged us throughout the journey of completing this project, "Development of a Woman Centric IoT Based Sanitary Pad Dispenser for Urban and Rural Areas."

We are thankful for the guidance, valuable suggestions, and constant motivation provided by mentors and well-wishers, which greatly helped in shaping the project and overcoming challenges. The technical knowledge and moral support received during the course of this project have been instrumental in its successful completion.

## VII. CONCLUSION

The proposed IoT-based sanitary pad dispenser is a robust, scalable, and woman-centric solution to improve menstrual hygiene access across diverse socio-economic contexts. By integrating smart card technology and real-time monitoring, the system ensures secure and timely product access. Future work will focus on solar-powered integration, machine learning for usage prediction, and integration with public health databases.

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