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# A Review on Intelligent Sanitary Napkin Machine

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**ABSTRACT:** Due to the rise of numerous diseases, sanitation and hygiene are given more focus today in order to stay safe. It is crucial to practise good hygiene throughout these days because menstruation is a normal part of a woman's life. Numerous health issues are brought on by improper cleanliness. It's also unsanitary to wear cloth during your period. Women in India are still hesitant to buy sanitary products from drug stores. We can solve this issue by placing vending machines in public areas, workplaces, restrooms, schools, and institutions. This paper offers a summary of the many intelligent sanitary napkin machines created in recent years. To construct sanitary napkin machines or vending machines, several researchers have used a variety of technologies, including IOT-based, ARDUINO-driven, RFID, etc.

**KEYWORDS:** Sanitary Napkin Machine, Hygiene, Vending Machines, IOT, ARDUINO driven

## I. INTRODUCTION

Utilizing sanitary napkins is crucial for women's menstrual hygiene. Only 57.6% of Indian women, or about 30 million women, use sanitary napkins for their monthly periods. When compared to the 96% percent seen in industrialized nations like the United States and the UK, this number is noticeably lower. According to a recent poll, menstruation protection is not adequate in India's main cities on a daily basis. Indian women often use reusable napkins made from natural fiber husk or recycled linen strips for feminine hygiene that have been used for generations. One of the most pressing problems is how to properly and safely dispose of soiled sanitary towels. Because they can pollute streams and rivers, soiled sanitary napkins shouldn't be flushed down the toilet as they can trigger hormonal changes in wildlife. For females to become aware of these issues at a young age, educational institutions must develop an educational programme. The government could take the initiative to set up a vending machine where a set amount of napkins can be purchased for free at government-run institutions and universities. To prevent additional landfill, it is also crucial to raise knowledge about the usage of biodegradable materials and their incineration. When it's time to get rid of them, they turn into a breeding ground for dangerous bacteria or germs [1].

## II. LITERATURE SURVEY

Smart sanitary napkin disposal technology was created by Prof. Somnath Wategaonkar et al. [2] the machine will be entirely automatic, controlled by an ARDUINO, and include a display that shows its present status. The procedure will start as soon as the sanitary napkin is placed inside the device and continue until the pad is completely burned. Heat-reflecting surfaces in the burning chamber concentrate the heat into the chamber's centre. The unwelcome smells and fumes coming from the burning pads will be filtered using a special filter assembly before being sent into drainage where they will be safe and clean..

A mechanism that automatically vends and disposes of sanitary napkins was created by V. M. Pimpalkar et al. [3]. This project aims to make it simple to obtain napkins and dispose of them after usage. When a user swipes their RFID card or drops a coin, napkins are distributed. When the system detects a coin or RFID card, it functions properly. A text message was issued and received by a pre-set mobile number when the napkin stock in the machine fell below the required level. It

was noticed that when napkins are added to the disposal machine, it also operates at its best. Using a QR code, ChandrakantBhange et al. [4] created a sanitary napkin vending machine. We are thinking of employing QR codes as a substitute for coins. The owner receives an SMS on the registered mobile number anytime the napkin is dispensed, and it also receives the quantity of napkins still in the vending machine, every time the QR code is scanned. When there are fewer than five sanitary napkins left, the owner receives a notification telling them to restock the appropriate vending machine. Implementation of a vending machine using a Finite State Machine (FSM) Model is suggested by B Jyothi et al. [5] and is done using VHDL. The most crucial step in creating the proposed vending machine model is FSM modelling because it lowers the amount of hardware needed. The process for state, including user selection, waiting for money insertion, product delivery, and servicing, is modelled in this project using the MEALY Machine Model. An effective algorithm for the development of a vending machine on an FPGA board was proposed by P. Pradeepa et al. [6]. Because FPGA-based vending machines respond quickly and consume less power than microcontroller-based ones. The FPGA-based vending machine accepts three coins and four goods. Additionally, it has a cancel feature, which allows the user to withdraw their request at any moment and have their money refunded to them without any goods. The suggested approach is put into practise using the Xilinx ISE simulator tool and Verilog HDL. The Xilinx Spartan-3A FPGA development board is used to implement the design.

A. Krishna Kumar et al. [7] create a vending machine that can dispense three distinct products at varying costs with the added functionality of "return change" when a coin of a higher denomination is entered and "return money" when a request is cancelled. Five and ten cent coins are accepted by the machine. For the design of the vending machine, the finite state machine (FSM) approach is used. The design is accomplished by using behavioural modelling to create the Verilog code for the FSM-based machine and the Xilinx ISE tool to simulate the test bench for three items. Aye AyeNyein and Ohnmar Win [8] offer a method that uses an RFID system rather than a coin or bill to function. This system only allows access via RFID, preventing machine abuse. The device has a tiny RFID reader installed. Each participant receives an identity card with an RFID tag. The only option for the ID card owner to obtain the desired snacks is to present the ID tag to the reader, and the necessary payment will be taken from their account.

Digital payment system using RFID tags is implemented by J. Paruvathavardhini et al. [9]. This system restricts access to just RFID-enabled devices to prevent machine abuse. Here, we have created a vending machine for educational facilities that students may use to purchase necessities like sanitary napkins, masks, and first aid supplies. When a specific product is chosen and the RFID tag is accessed, the machine will dispense the product and calculate the appropriate amount. A raspberry pi-based system created by PrathameshBarik et al. [10] uses an RFID reader to get user credentials from a secure database, saving users' time in the process. Only the admin has access to this database. In order to purchase the stationery with the least amount of machine interaction possible, the user would have access to a keypad and graphical user interface.

### III. PROPOSED SYSTEM ARCHITECTURE

Figure 1 shows the architecture of proposed system. This project intends to create an intelligent vending machine for sanitary napkins that is IoT-based. Arduino is used to control it. Coins and an RFID card can both be used to operate the napkin dispenser. When a user swipes an RFID card or drops a coin, the RFID reader or coin acceptor identifies the coin or card, and the Arduino sends a signal to activate a relay. The motor turns the spring coil to dispense a new napkin once the relay in turn activates it. The Arduino monitors the quantity of napkins still in the dispenser and automatically sends an SMS to the concerned person's Android phone and web server when the napkins need to be refilled.

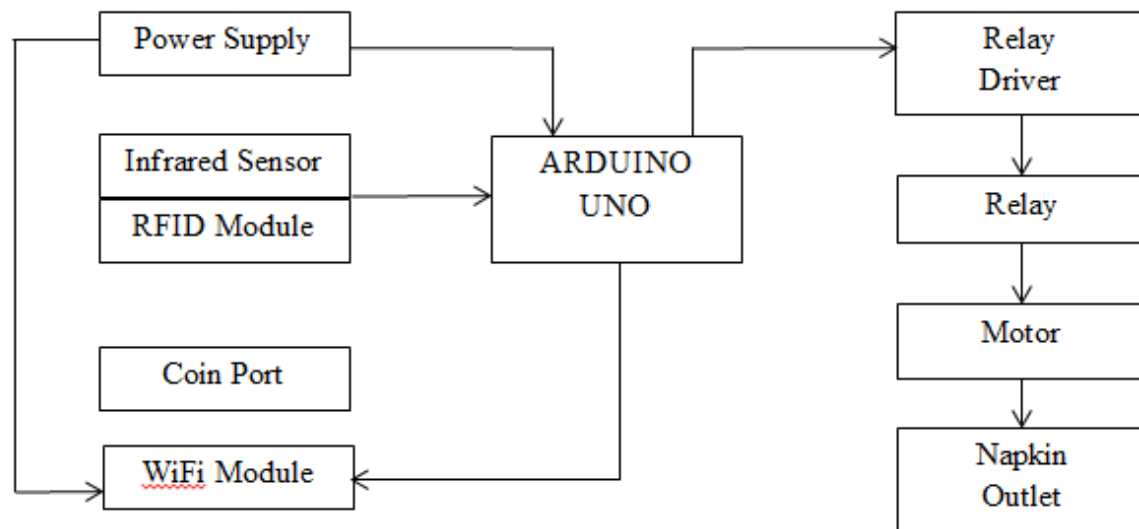


Figure 1 Architecture of proposed system

#### IV.CONCLUSION

It has always been difficult to find stationery at offices and/or college campuses. Students and professionals who frequently need to find their way around looking for a stationery shop now have an efficient approach to buy such stationery. Given that menstruation is a normal part of women's lives, it is crucial to practise good hygiene throughout this time. Many health problems develop as a result of improper cleanliness. This article presents a summary of the various intelligent sanitary napkin machines created in recent years.

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