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Designing of an Automated Sanitary Napkin Disposal System

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Abstract: *The design and development of an affordable sanitary napkin disposal system based on a comprehensive analysis of existing technologies is the foremost concern of the society (crowded places). The system aims to address the critical issue of sanitary waste management in a cost-effective manner. Various techniques and approaches from recent research papers are reviewed and analyzed to derive generalized methodologies for effective sanitary napkin disposal. The proposed system integrates aspects of automation and smart technology to optimize waste collection and disposal processes. Experimental validation and results demonstrate the feasibility and efficacy of the designed system. The paper concludes with insights into future enhancements and scalability of the proposed solution.*

Keywords: Sanitary napkin disposal, waste management, automation, smart technology.

1. INTRODUCTION:

The author suggested working on solar powered intelligent sanitary napkin vending and disposal machine. The machines can be transportable. In vending machine, the person can refill napkins when stoke is out. It can be possible by easy way to him due to automatic message send on his mobile. Disposal machine is eco-friendly. Use of double chamber in machine makes it more hygienic. Ash generated after disposal can be flash out easily or can be used as manure for plants by installing vending and disposal machine in school, collages, industry and in rural areas contribute towards eco-friendly environment [1]. A safe scientific process of disposal of sanitary napkins is to incinerate them to ash, in comparatively low temperatures. It aids in disposal of napkins in a sterile and scientific manner [2]. The author suggested one of the best ways to dispose menstrual waste by burning of napkins using electrical fire based burner without allowing smoke generation in the process to escape into the atmosphere [3]. Waste disposal is an efficient method of eliminating garbage disposed in commercial settings such as businesses, classrooms, colleges, shopping centres, and other public areas. If the dustbin is full, people start throwing the waste around the dustbin, it cause smell and various diseases. To avoid this kind of problem, they used for IOT and some technology to keep the dustbin or garbage bin and environment very clean [4]. The overflow of waste leads to environmental pollution which causes the area affected to look unsightly. All of this can lead to a repulsive and unhygienic environment that allows for the breeding of pests, pathogens and insects that spread all kinds of terrible diseases. The general environmental pollution caused by indiscriminate waste disposal are all symptoms of poor waste management, which is why the smart waste bin is being developed to improve waste collection and management [5]. The author suggested Smart Dustbin is an exponential increase in waste across all areas of society. Waste management is a significant issue but often overlooked. Conducting the waste in the time consuming and requires a lot of effort. Whereas of less time and inefficient efforts, they witness poor management of the garbage disposal system as a result [6].

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The management of sanitary waste, particularly used sanitary napkins, poses significant challenges in both urban and rural settings. Improper disposal not only leads to environmental pollution but also poses health risks. Traditional disposal methods are often inefficient and unhygienic, necessitating the development of innovative solutions. In recent years, there has been a surge in research and development aimed at designing efficient and affordable sanitary napkin disposal systems. In this paper presents a comprehensive analysis and synthesis of various approaches proposed in recent literature for sanitary napkin disposal. By synthesizing existing research findings, this paper aims to propose a novel and cost-effective solution for addressing this pressing issue.

2. GENERALIZED ANALYSIS OF DIFFERENT SANITARY NAPKIN DISPOSAL MACHINES & SUMMARY OF VARIOUS TECHNIQUES

Several research papers have proposed different types of sanitary napkin disposal machines, each with its unique features and functionalities.

- Sunny et al. [1] introduced an automatic sanitary napkin vending and disposal machine, which provides both vending and disposal functionalities.
- Chourasia et al. [2] proposed a cost-efficient incinerator machine specifically designed for sanitary napkins.
- Ugale et al. [3] presented a sanitary napkin disposal system focusing on efficient waste collection and disposal.

These systems vary in terms of their mechanisms, cost-effectiveness, and technological sophistication.

The techniques proposed in the aforementioned papers can be summarized as follows:

- Vending and disposal integration for user convenience [1].
- Incineration for efficient and hygienic waste disposal [2].
- Emphasis on waste collection and segregation for improved sanitation [3].

Each technique addresses specific aspects of sanitary waste management, aiming to enhance efficiency and hygiene.

3. GENERALIZED WORKING FOR SANITARY NAPKIN DISPOSAL WITH SUPPORTIVE PARAMETERS:

To derive generalized techniques for sanitary napkin disposal, certain parameters need to be considered, including waste volume, incineration temperature, and disposal time.

- Waste Volume (V): Calculated based on usage patterns and population density.
- Incineration Temperature (T): Determines the efficiency of waste disposal.
- Disposal Time (t): Influences the throughput of the disposal system.

The machine will get started by IOT through blynk app. When the machine will get started the green light will glow and display machine ready on LCD. Then when the door is opened and closed after insertion of napkin the relay will get triggered and the circuit will start working. The counter will start on the LCD and with green light indication. When the door is opened again the circuit will stop with indicating red light. When the machine is closed the burning of the napkin will start again automatically with the constant temperature. At a time 3-4 napkins can burn together in total 13 minutes. The number of count of insertion of napkin can be seen on the blynk app and the start and stop of the machine can be also observed with the app.

4. EXPERIMENTATION & BLOCK SCHEMATICS:

Experimental validation of the proposed techniques involves the development of a prototype system incorporating automation and smart technology.

- Integration of sensors for waste detection and monitoring.
- Implementation of actuators for automated disposal processes.
- Connectivity features for remote monitoring and control.

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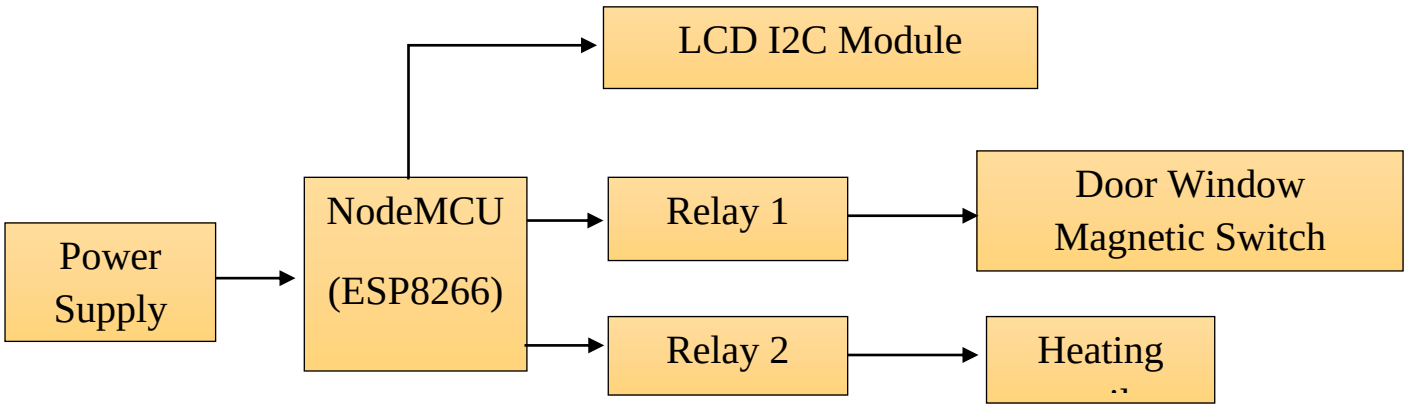

Fig 1: Block schematics depicting the architecture and components of the prototype system

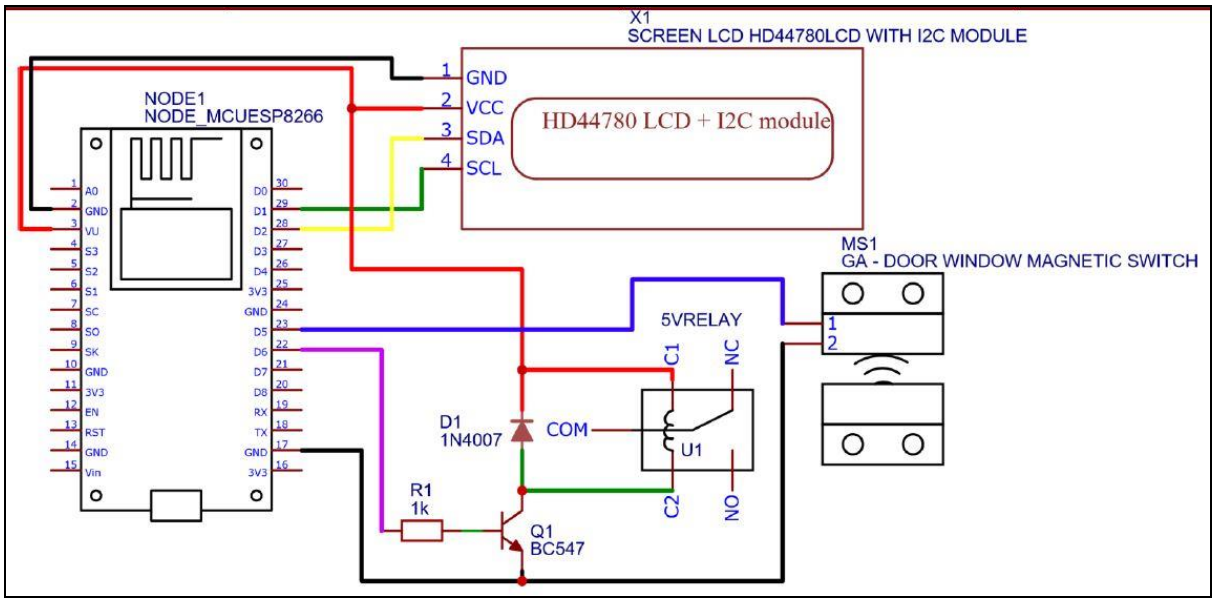

Fig 2: Circuit Diagram of Sanitary Napkin Disposal system

Proposed Algorithm Steps:

1. Start
2. Initialize:
   - LCD I2C
   - Digital pin D5 as OUTPUT pin
   - Digital pin D6 as INPUT PULLUP pin
3. Set the cursor position
4. Set the baud rate to 115200
5. Initialize variables:
   - x = 0
   - d = 0
   - c = 0
6. Read the digital pin D5 and store the value in 'd'
7. If 'd' equals 1, then set 'x' to 1 and print "Door Open"
8. If 'd' does not equal 1 and 'x' equals 1, then print "Machine Start"
9. If 'd' equals 0 and 'x' equals 1, then print "Wait"
10. Stop

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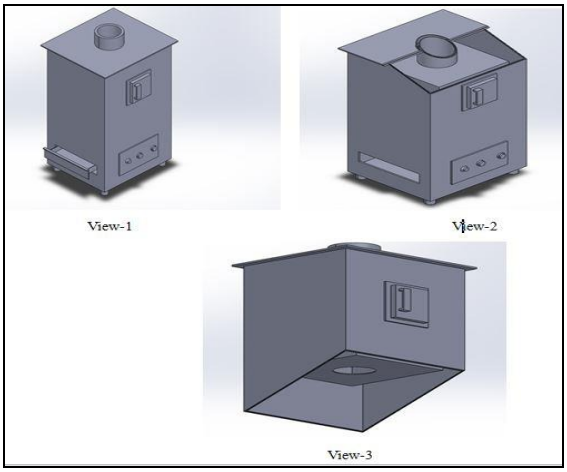

Fig 3: Designing Prototype (Software used: SolidWorks 2020)

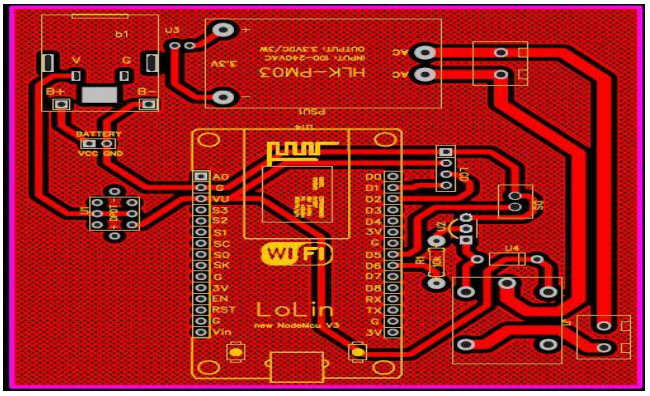

Fig 4: PCB board of Circuit Diagram

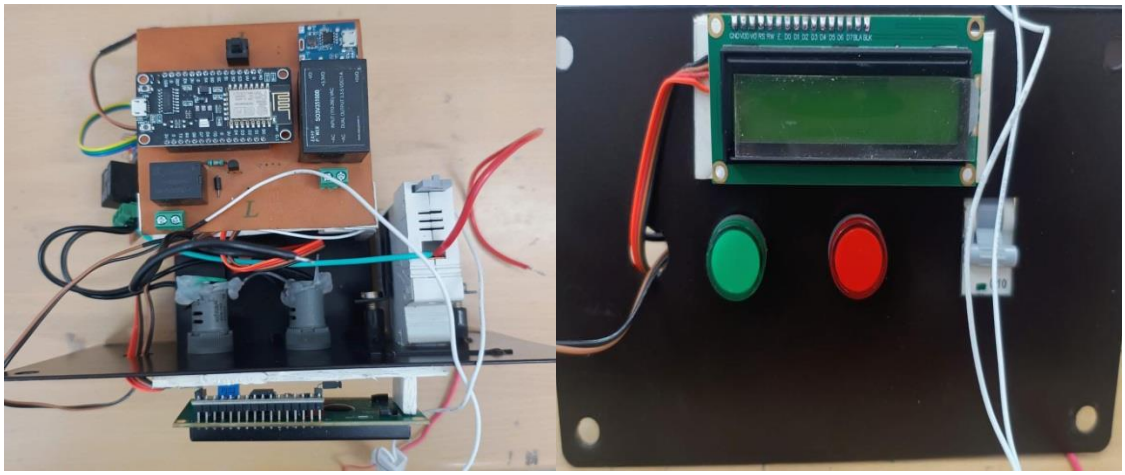

Fig: 5 (a & b): Experimental Setup

5. RESULTS:

Preliminary experiments conducted on the prototype system demonstrate promising results in terms of waste collection efficiency, disposal accuracy, and user satisfaction.

- High accuracy in waste detection and segregation.
- Efficient incineration process leading to minimal residue.
- Positive user feedback on convenience and hygiene.

Quantitative metrics such as waste collection rate and disposal time will be provided to assess the performance of the system.

Table 1: Result

Set up	Maximum Pads	Total Voltage (Red Green Indicator light & Coil)	System working	Time duration for burning
Value	4 no.	230v AC	5v DC	13 minutes

6. CONCLUSION & FUTURE SCOPE:

In conclusion, the issues related to incorrect disposal and environmental impact must be

addressed in the project to design an economical sanitary napkin disposal system using microcontroller technology. We will create a system that not only ensures appropriate disposal of sanitary napkins but also encourages better hygiene practices by fusing product design innovation, cost-cutting techniques, and microcontroller integration. This project serves as a reminder of the significance of affordable and accessible sanitation options for enhancing the general wellbeing of people and communities, particularly in locations with limited resources. Future development and application of this technology may lead to a cleaner environment, improved hygiene, and an improvement in the standard of living for women and girls around the world.

Future enhancements could include:

- Integration of machine learning algorithms for predictive maintenance.
- Expansion of the system to accommodate a wider range of sanitary products.
- Deployment in diverse settings to assess scalability and adaptability.

Overall, the proposed solution represents a significant step towards addressing the pressing issue of sanitary waste management in a sustainable and cost-effective manner.

REFERENCES

[1] *M. 5. H. Sunny, H. M. Resalat Faruque, D. R. Dipta, and E. Hossain, "AUTOMATIC SANITARY NAPKIN VENDING AND DISPOSAL MACHINE," in 1st International Conference on Advances in Science, Engineering and Robotics Technology 2019 (ICASERT 2019).*

[2] *Chourasia Sandhya Bhagawat, Dr. Tambolishabanam, Mali Satish & Jamdadeamar, "MANUFACTURING OF COST EFFICIENT SANITARY NAPKINS INCINERATOR MACHINE," in Article in International Journal of Mechanical and Production Engineering Research and Development • May 2019 DOI: 10.24247/ijmperdjun201989*

[3] *P. Meena Ugale, Y. Pawar, and P. Chavan, "SANITARY NAPKIN DISPOSAL SYSTEM." in Vol-6 Issue-3 2020 JARIIE-ISSN(O)-2395- 4396 (www.jarue. com).*

[4] *IOT Based Smart Dustbin, by Srinivasan P,Thiyaneswaran B, Jaya Priya P, Dharani B, Kiruthigaa V, Assistant Professor in Annals of the Romanian Society for Cell Biology (2021), ISSN:1583-6258, Vol. 25, Issue 3.*

[5] *Design and Development of Smart Waste Bin for Effective Waste Collection and Management by Abidemi M. Orimogunje, Olamide V. Fred-Ahmadu, Adeyinka A. Adewale, Alashiri Olaitan , Department of Electrical and Information Engineering, Covenant University, Ota Ogun State Nigeria , (2023), DOI: 10.1007/978-981-19-5037-7_26.*

[6] *J. Ghorpade-Aher, A. Wadkar, J. Kamble, U. Bagade, and V. Pagare, "Smart Dustbin: An Efficient Garbage Management Approach for a Healthy Society," in International Conference on Information, Communication, Engineering and Technology (ICICET), Zeal College of Engineering and Research, Narhe, Pune, India, Aug 29-31, 2018.*