



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 13, Special Issue 2, May 2024



Impact Factor: 8.423

Milk Vending Machine

**Prof. Kalpita Mane¹, Prof. Riyaj Kazi², Prof. Sanjana Desai³, Ms. Mayuri Suryawanshi⁴,
Mr. Sameer Shaikh⁵, Mr. Hamid Jalgaonkar⁶**

Assistant Professor, Department of E&TC, Ajeenkya D. Y. Patil School of Engineering (ADYPSOE), Pune, India^{1 2 3}

UG Student, Department of E&TC, Ajeenkya D. Y. Patil School of Engineering (ADYPSOE), Pune, India^{4 5 6}

ABSTRACT: The aim of this paper is to assess the current situation in the sale of milk through vending machines in the context of the previous period of the decline in milk consumption, the transition of the Czech Republic towards the market economy, the transformation of agriculture, the entry into the EU and the concentration in the milk market and to define the basic motivational factors and barriers of the development of this distribution path. Technical problems with sales, intent to diversify milk selling and aiming the high profitability of the sale are the reasons for operating vending machines that are correlated with the share of this selling channel on producers' total sales of milk. Vending machines are inhibited by misinformation from state authorities; other problems are weak support by media and low consumer awareness. The expectations of the operators concerning the development of the situation of the milk vending machines are rather optimistic: 36% of them expect an increase in sales, 48% expect the stagnation and only 16% expect the decrease. Machines have played a very important role in making human life easier. Automatic vending machines are very helpful in providing various needed full items for general people. Here we discuss the development of automatic milk vending machine. This equipment is available in a plethora of various on the market. Our goal in this project is to offer simple, affordable designs that are more effective and have convenient payment options. A card system is utilized for milk payment and dispensing in order to remove the need for human intervention. This card system has RFID, which is made up of user-friendly RFID tags and an RFID reader.

KEYWORDS: Microcontroller, RFID, Sensor, GSM

I. INTRODUCTION

In order to cut down on wait times and carry money, individuals frequently utilize cards to pay for goods shops and shopping centers these days. But in milk centers, there's always a huge line to get milk, and you have to pay with cash. To solve this, milk flow may be measured and money can be collected using an RFID reader and microcontroller. This technology distributes milk without requiring human contact by using RFID tags. In order to prevent problems with image processing and beam interruption approaches, RFID traffic management is also utilized. An RFID tag installed in every car transmits signals to the police control center. It was suggested to use an autonomous decentralized system (ADS) to judge when to send card to adjacent gas bunks in order to react to changing circumstances. A milk vending machine is a device that dispenses milk products to customers after payment. Milk vending machines are becoming increasingly popular as they offer a convenient and cost-effective way for customers to purchase fresh milk products. The Milk Station Company is a YouTube channel that features videos on milk vending machines, including an introduction to their machines and how to clean them¹. Milk vending machines are also being introduced in the UK as a way for dairy farms to sell their products directly to customers. For example, Curlew Fields Farm in Hessay, York, has introduced a milk vending machine that allows customers to buy a reusable bottle and fill it with pasteurized milk produced on the farm. The machine also offers milkshakes with various flavors. Milk vending machines offer a convenient and cost-effective way for customers to purchase fresh milk products. They are becoming increasingly popular as they offer a sustainable and eco-friendly alternative to traditional milk packaging. QR code technology can further enhance the customer experience by allowing for contactless payment and easy transaction tracking.

Milk vending machines offer a convenient and cost-effective way for customers to purchase fresh milk products. They are becoming increasingly popular as they offer a sustainable and eco-friendly alternative to traditional milk packaging. QR code technology can further enhance the customer experience by allowing for contactless payment and easy transaction tracking.

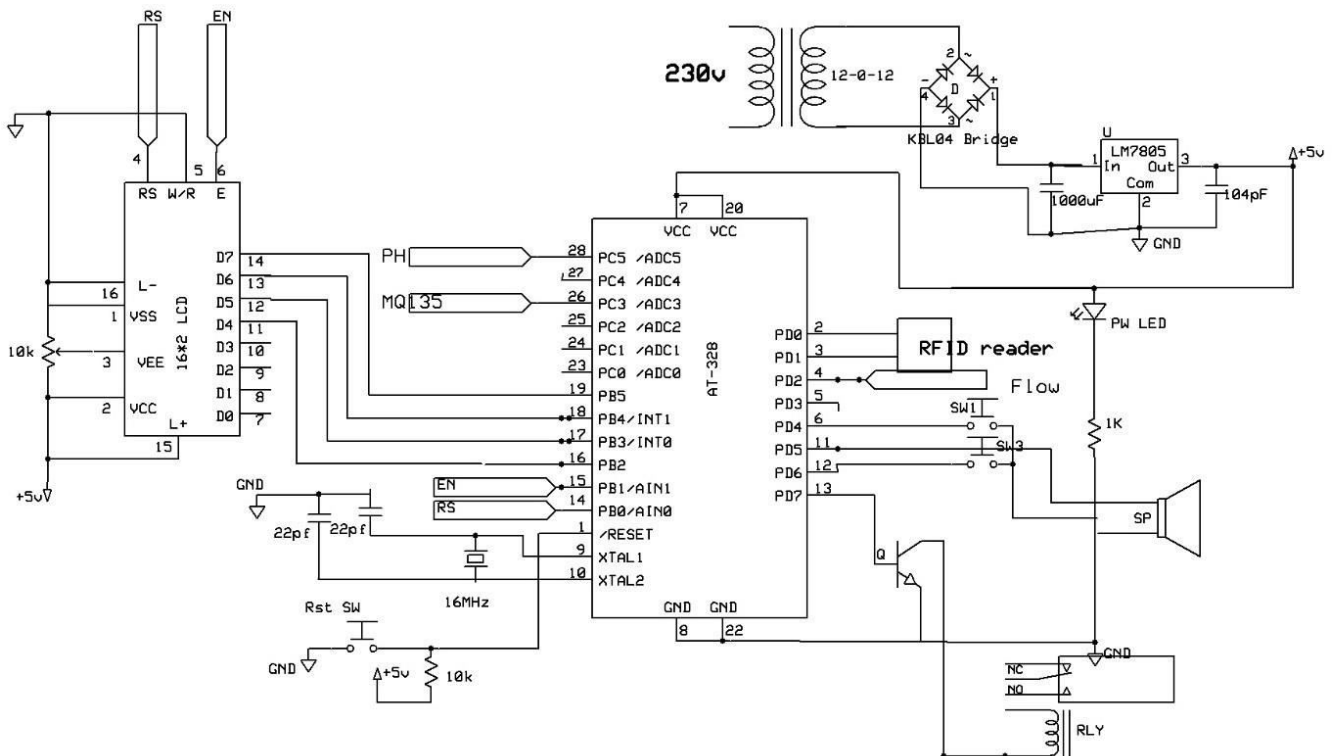
II. AIM

The aim of milk vending machines is to provide consumers with convenient access to fresh, locally sourced milk while promoting sustainability, supporting local farmers, reducing environmental impact, and meeting the evolving needs of modern consumers. It also benefits dairy owners by reducing operational costs, providing sales reports, and maintaining milk quality through temperature control. The vending machine is designed to be easily movable, enabling owners to adapt to market demands and reduce product prices by eliminating middlemen. Overall, the milk vending machine aims to promote fresh milk consumption, support local dairy farmers, and contribute to a circular economy.

III. METHODOLOGY

The proposed project uses refrigerated containers for milk storage, separating it into three different qualities based on PH value, water content, and viscosity. Quality will be used for bifurcation and classification. Consumers input required quality and standard quantity values in a numeric keypad, and the machine asks for payment using rechargeable cards with RFID. Milk is dispensed from the outlet after payment is made. An LCD display will display milk quality and purchase details. A GSM module and level sensor will notify manufacturers or milk distributors for milk refills when used up. Hot water must be run through the machine for cleaning. If commercialized, a maintenance team can monitor usage and cleanliness, increasing employability. The methodology for implementing a milk vending machine involves several steps. First, the machine should be strategically placed in a well-lit and ventilated area with stable water and electric power supplies, preferably in busy shopping areas or supermarket

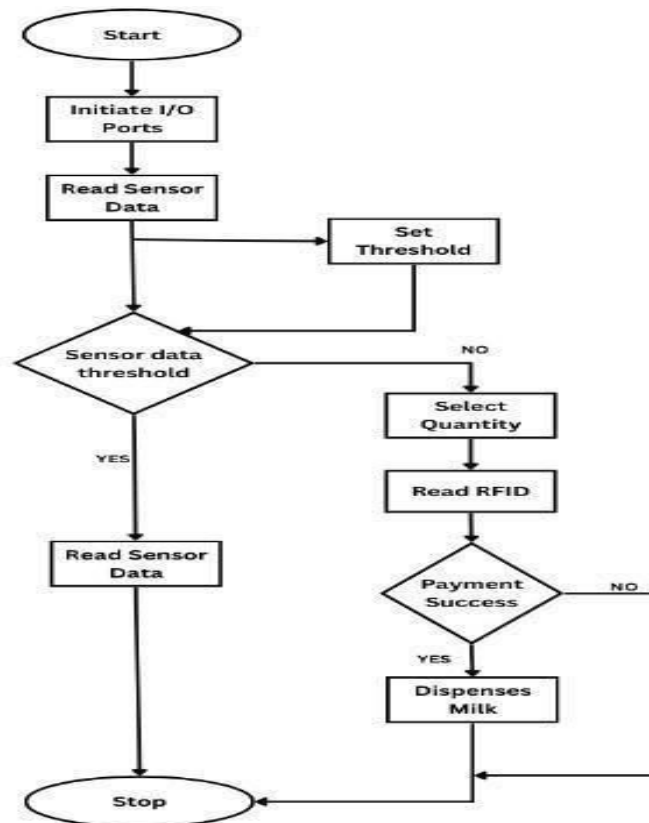
IV. CIRCUIT DIAGRAM



1. Power Supply:- A 9V DC power supply is utilized to power the submersible pump for milk dispensing, which can be connected to the VIN and GND pins of the Arduino Uno board.
2. Arduino Uno Board:- The Arduino Uno board is the primary controller, connecting to the power supply and other components like the GSM module, I2C interface, flow sensor, submersible pump, and 5V relay.

3. GSM Module:- The GSM module is utilized for sending and receiving SMS messages from a user's smartphone, connected to the Arduino Uno board via serial communication pins (TX and RX).
4. I2C Interface:- The Arduino Uno board can be connected to an OLED display via an I2C interface, displaying transaction details and other relevant information.
5. Flow Sensor:- A flow sensor is utilized to measure the quantity of milk dispensed, connected to the Arduino Uno board via digital input pins.
6. Submersible Pump:- The submersible pump, connected to the Arduino Uno board via a 5V relay, is used to dispense the necessary amount of milk.
7. Resistors and capacitors:- Resistors and capacitors are crucial in circuits to regulate voltage and current levels, while also safeguarding components from damage.
8. The components are connected to the Arduino Uno board, and the code is uploaded using the Arduino IDE.

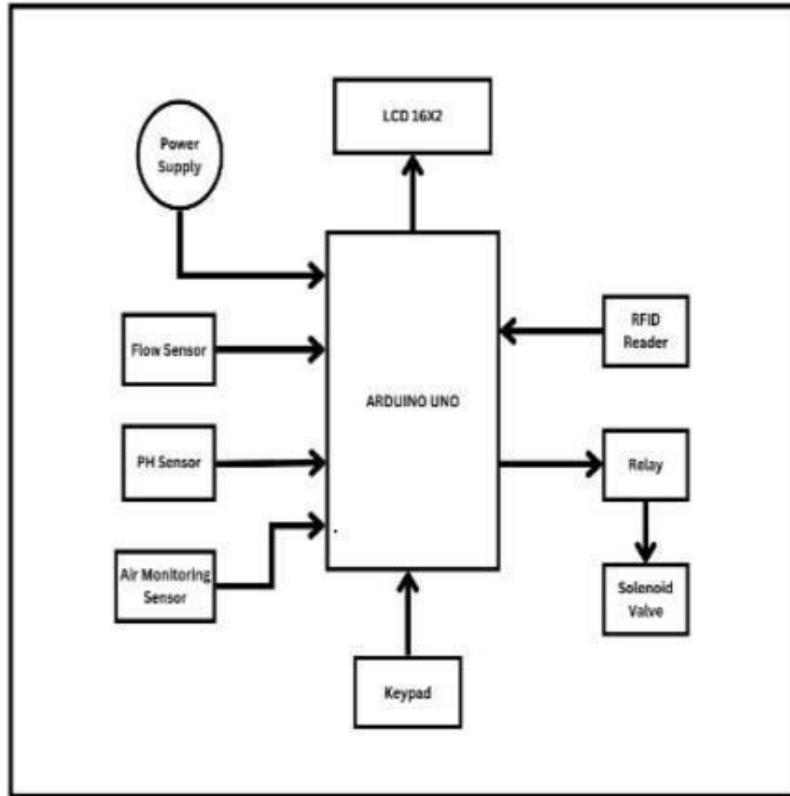
V. WORKING PRINCIPLE



The steps of a milk vending machine can vary depending on its specific features, but common steps include:

- Selecting the desired product: Customers can choose their desired product from the vending machine using methods like entering a code, scanning a QR code, or sending an SMS message.
- Payment: Customers can pay for their selected product using various methods like coins, mobile wallets, order bit/credit cards.
- Dispensing the product: The vending machine dispenses a product after payment, with milk quantity measured using a flow sensor and controlled by a submersible pump.
- Updating the inventory: The vending machine maintains stock levels by updating its inventory system after dispensed milk, ensuring that the machine's stock levels remain current.
- Transaction completion: The milk vending machine process involves selecting the desired product, making payment, dispensing the product, updating inventory, and completing the transaction, making it hygienic and safe, especially during the current pandemic situation, and allowing customers to leave with their milk

VI. PROPOSED SYSTEM



The architecture of a milk vending machine typically involves several key components, including a user interface, a payment system, a milk storage and dispensing system, and a control system. The user interface typically includes a touchscreen or other input device that allows users to select the milk product they want to purchase and make payment. It may also include a display that shows the price, quantity, and other information about the milk product. The payment system can include various payment methods, such as cash, credit/debit cards, or mobile payments. It typically involves a payment terminal or other device that communicates with the control system to process payments and dispense the milk product.

The milk storage and dispensing system includes a milk storage tank, a pump, and a dispensing mechanism. The milk storage tank holds the milk product, while the pump draws the milk from the tank and dispenses it into a container provided by the user. The dispensing mechanism may include sensors to ensure that the correct quantity of milk is dispensed and to prevent overflows. The control system is the brain of the milk vending machine and typically includes a microcontroller or other programmable device that controls the various components of the machine. It may include sensors to monitor the temperature, pressure, and other conditions of the milk product, as well as a communication system to send alerts or alarms if there are any issues with the machine. The architecture of a milk vending machine may also include security features, such as locks, alarms, or cameras, to prevent theft or vandalism. It may also include a power system, such as a battery or generator, to ensure that the machine can operate even if there is a power outage.

VII. RESULT AND DISCUSSION

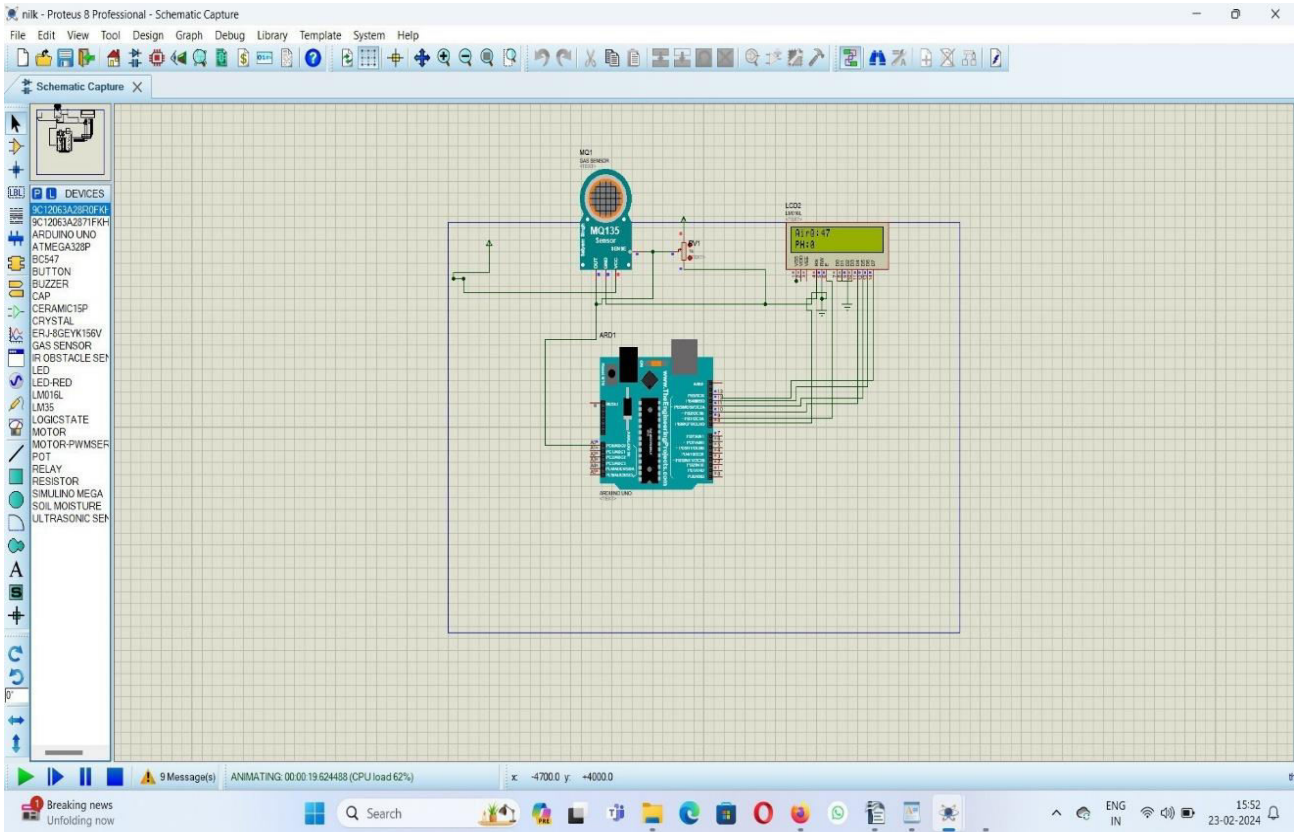


Fig1. Software simulation

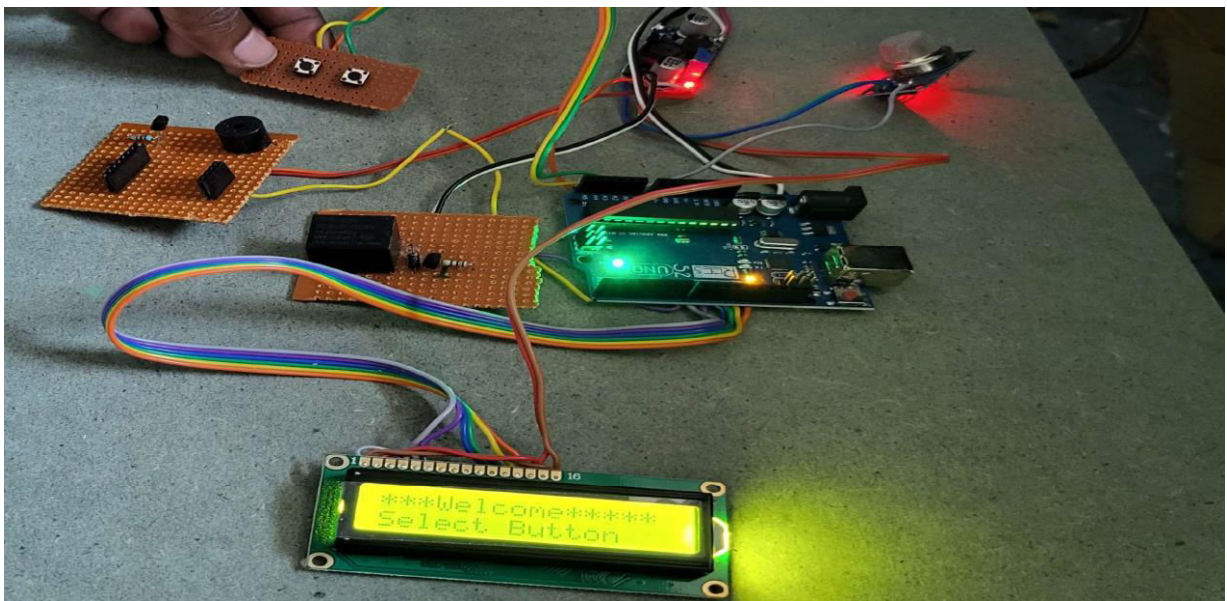


Fig2. Hardware implementation

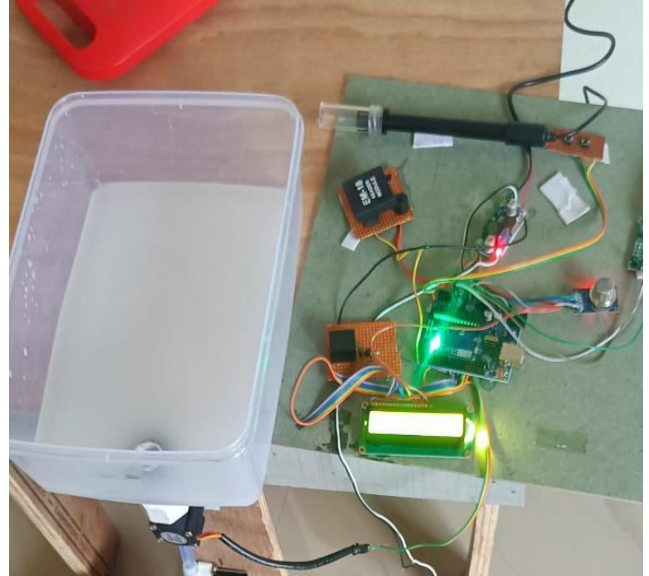
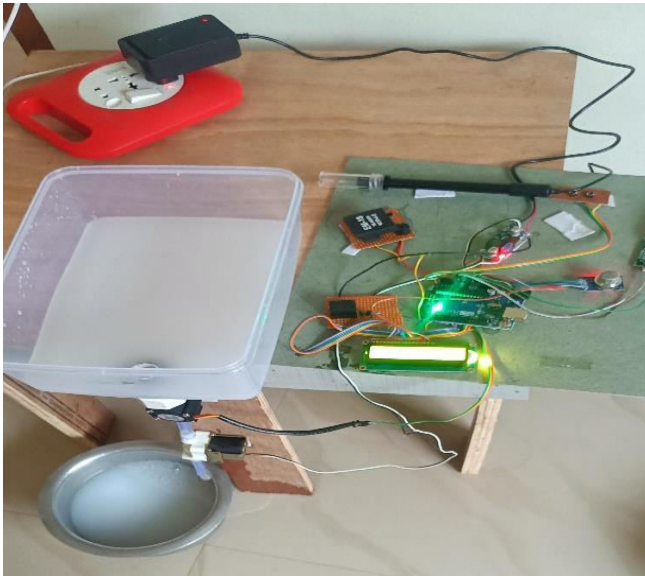


Fig3. Scanning card using RFID



Fig4. Measure the water testing

VIII. CONCLUSION

In conclusion, milk vending machines offer a convenient, safe, and efficient way for users to access fresh, locally sourced milk. These machines can be calibrated to dispense a specific quantity of milk per SMS message and can also send an SMS message to the user with the transaction details. The use of basic components such as Arduino Uno, GSM 900, I2C, flow sensor, submersible pump, and 5V relay in the milk vending machine project demonstrates the feasibility of building a simple and effective vending machine. Milk vending machines are also a more sustainable way to purchase milk as they reduce plastic waste and support local agriculture by sourcing milk from local farms. Overall, milk vending machines provide numerous benefits to consumers, farmers, and the environment, making them a promising solution for the future of milk distribution. This paper discusses the history of technical issues and challenges in vending machines, particularly milk vending machines. It highlights the potential for equal distribution of milk supply, avoiding wastage, and simplifying payment. The technology of vending machines can be used to facilitate various food consumer products, and in the future, online systems could be implemented for more reliable product distribution management. This would make the process more efficient and efficient for companies.

REFERENCES

1. K. R. Nimisha, K. Indumathi, R. Divyamani, R. Kavya, K.Gowrimanokari, "Smart Newspaper Vending Machine." Asian Journal of Applied Science and Technology (AJAST) Volume 1, Issue 1, Pages 131-136, February 2017.
2. Preetilatha R, Ramkumar R, Ramesh S. M, Kiruthika S, Bharani M, "Stationery Vending Machine," International Journal of Innovative Science, Engineering & Technology, Vol. 1 Issue 9, November 2014.
3. Ana Monga, Balwinder Singh, "Finite State Machine based Vending Machine Controller with Auto-Billing Features" International Journal of VLSI design & Communication Systems (VLSICS), Vol. 3, No. 2, April 2012.
4. Sasikala G, Kuldipsing Rajput, Sarfaraj Hussain and Aastha Shrivastava, "Real Time Embedded Based Drinking Water Vending Machine," Asian Journal of Science and Technology, Vol. 5, Issue 12, pp. 804-809, December 2014.
5. Indrajeet Deshmukh, Shubham Angre, Digvijay Kakde, Roshanrahane, "Designing and Implementation of Water Vending Machine," IJARIE, Vol. 2, Issue 3, 2016.
6. Roger W. Webster, Paul W. Ross, D. E. Timothy M. Bailey Stacey M. Conrad Michael J. Fiorill John M. Flinchbaugh Eric A. Velkly, "Controlling A Java Enabled Pepsi Vending Machine Over the World Wide Web.
7. Dhamale Avinash and Game Avinash (2016), ' Milk analyzing and billing system, International Journal of Advance Research and Innovative ideas in Education-ISSN(O)-2395-4396, Volume 2, Issue-2.
8. S.Suthagar, T.Jesammal, J.Alphiya grace "Aadhar Based Electronic Voting System and Providing Authentication on Internet Of Things" The Third International Conference on Electrical, Electronics and Computer Engineering (ICEECE - 2017) March 2017
9. S.SanthoshVarma and Syed Rahim (2015), 'Categorising the Quality and Estimating the Quantity of The Milk By Embedded System Using Zigbee,' Biosciences Biotechnology Research ASIA, Volume 12(2)1425-1432



INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 9940 572 462  6381 907 438  ijirset@gmail.com



www.ijirset.com

Scan to save the contact details