iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 4 **Issue:** VI **Month of publication:** June 2016

DOI:

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

Volume 4 Issue VI, June 2016
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

Fair Price Shop Automated Vending Machine Design Using RFID and GSM Communication Technology

Yuvaraju.M[1], Pranesh. K A[2]
[1]Assistant Professor, Dept. of EEE, Anna University Regional Campus, Coimbatore
[2]Pg Scholar, Dept. of EEE Anna University Regional Campus, Coimbatore

Abstract-The fair shop automated vending machine is designed for the fair distribution of ration materials to the consumer more efficiently by reducing the malpractices and forgeries in the ration shop. The machine consists of a controller unit to control the overall operation of the machine, which have a PIC microcontroller, RFID kit, GSM module, load cell and solenoidal value. Thequantity of the products delivered through this machine is more accurate. The database of the product is updated eventually to the government database through the GSM module which makes the process more transparent to the government and the consumers and reduces the human errors and malpractices like fake entry, product piracy etc.., By using this machine the ration shop is fully automated and functioning of the shop will be more efficient without the humans.
Keywords- GSM, keypad, LCD, PIC, RFID,

I. INTRODUCTION

A vending machine is designed for the automatic material dispense without manpower. It works in manner that when a currency is inserted in to the machine it delivers the product according to the user choice.

There are different types of vending machine used for different applications for reducing the effort and error caused by the human begin due to their carelessness and lack of concentration in work. The types of vending machine used in day to day are coffee and other hot drink vending machine, soda and other cold drink vending machine, snack and sweet vending machine, ice cream and frozen food vending machine, food vending machine, gumball and novelty machine, water coolers and ice dispensers, medicine and hygiene product, healthy vending machine, newspaper vending machine, custom vending machine etc,

The Fair price shop is the largest retail system in the world,which widelyinvolve lot of controversial issues of malpracticeshappening in the ration shops. The process followed by the ration shop is,government provides aration card for a family. These cards are allotted to the family based on their income category. By the annual income of that family the provided card different privilege of purchase of product. In order to buy a product one must go the ration shop with his ration card and waits in a queue, when his turn comes, the consumer gives his card to the officer, and the officer checks the card and makes entries to the government register by mentioning the allotted product to the consumer and the product is delivered to the consumer.

This system has two main drawbacks, first is the in-appropriate quantity of products and secondly making the fake entries, material piracy, and black market.

The proposed system eliminates the above mentioned drawbacks and also provides the transparency to the consumers.

II. EXISTING APPROACH

In the existing method the distributionof products in the fair price shop requires lot of human effort and paper work to be handled. Tracking and dumping of the records requires more space and time which makes the work bitter and allowing the chances for malpractices to occur. Where the piracy of the ration card occurs, in which any one can use any ones ration card with or without their knowledge, permission and even without any prior information, which is considered to be the illegal usage of the card according to the government.

This conventional method of has many difficulties, when consumer needs to buy the ration product the consumer needs to visits the ration shop where the consumer needs to stand in the queue to grab his turn, when his turn comes he needs to show his ration card to the officer, the officer will check the card and enter the details of the purchase in the government register after which the consumer is allowed to buy the allotted products, The major drawbacks of the existing approach are the piracy of the ration card, false entry of product purchase, material hijacking, black marketing, in appropriate quantity of product delivery etc. which are been eliminated by

Volume 4 Issue VI, June 2016
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

the proposed method.

III. PROPOSED METHOD

The main objective of the proposed system is to reduce the human interference and provide security by automation of the shop using modern technologies.

To add the security feature the machine have a build-in keypad and biometric fingerprint scanner for the authenticated user to access the machine. The consumer is provided with the RFID card which is fed with consumer id, which hasthe family member details along with the fingerprint by interfacing it with the AADHAR card. By interfacing an AADHAR card with our smart RFID card, the every information about that family is fed in to the smart card. So the each purchase through is this card is digitally recorded and updated to the government database using the GSM module and also the consumer gets the information about their purchase is send through the message to the registered mobile phone registered in the AADHAR card, which increases the transparency of the system.

The figure shows the block diagram of the proposed system. The system consists of a PIC microcontroller unit for the controlling process, which has been interfaced with the RFID reader, keypad, a biometric finger print scanner, LCD display, motor unit, solenoidal unit, load cell and a GSM module.

The RFID reader is registered with the all consumer ids collected through the AADHAR card, the smart card given to the family have the unique id for the family, when the reader scan the smart card of the consumer the details of the family is retrieved from the government databasealso their finger print models.

LCD display is used to show the process of operation and also the details of the product available in the shop, which helps the consumer to choose the right one.

The machine uses the gunshot DC gear motor for the flow control of the solid materials like rice, sugar etc. the of the machine below the delivery value of the solid materials, there is an load cell which gives the feedback signal to the controller unit, when the load cell reaches the weight of material selected by the consumer it sends the signal to the controller and the motor stops.

The solenoidal unit is for delivering of the liquid materials, the controller is programmed in such a way that it is fed with the pre-defined values for the run time of the solenoidal gate value, each quantity have a different run time, which opens and closes automatically according to the quantity selected by the consumer. The GSM module is used for transparency of operation between consumer and the government, the GSM is for sending the message and updating the government database. The consumer receives the messages through SMS when their card is used by another person not belonging to their family as an alert message indicating “unauthorised usage of card” and also receives an message of purchase information when the consumer finishes his purchase, the details of purchase is send to the government database and the stock database is updated which will eliminate the black market of ration products.

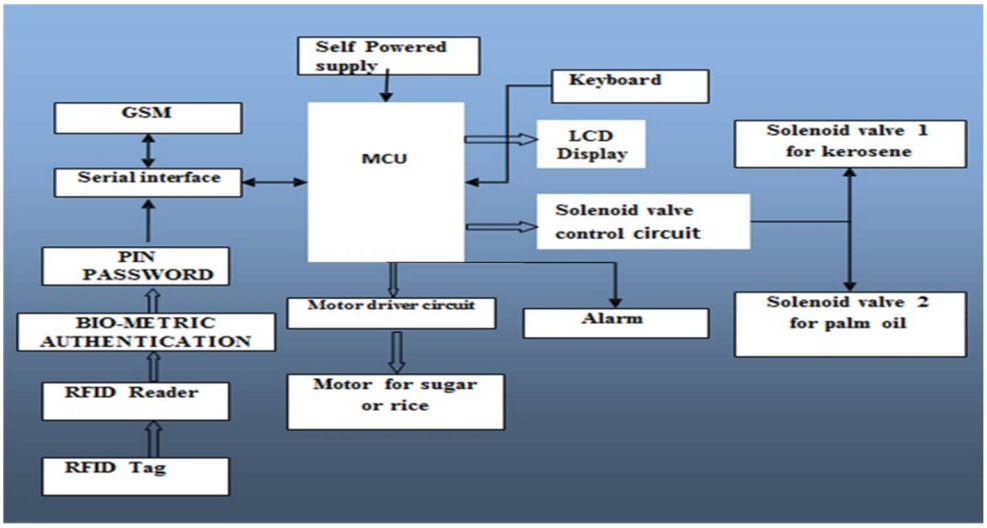


Fig.1: Block diagram of fair shop vending machine

A. *Microcontroller*

Peripheral Interface Controller has lot of controllers in which 16F series has the most importance when compared to other series.

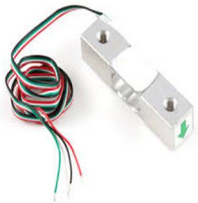
Volume 4 Issue VI, June 2016
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

PIC16F877A is a 40 pin controller which is most commonly used in most of the applications anditsoperating voltage is 2 to 5.5V. Microcontroller helps to store and send the Unique Identification Number of the RFID tag which is read by the RFID reader. All the peripheral components are interfaced together only by the microcontroller. The features of PIC16F877A make it more advisable for A/D applications in automotive, industrial, electronic appliances and consumer applications.

B. RFID

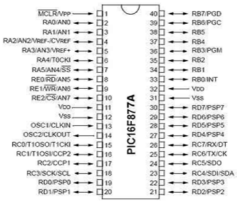
Radio Frequency Identification is an electronic device which consists of a small chip and an antenna. The chip can carry a data of about 2000 bytes. RFID is similar to the barcode which provides a unique identifier for that object. RFID device is scanned to retrieve the information. RFID tag is scanned and categorized by means of Unique Identification Number (UIN) by the RFID reader and it is not necessary that the RFID tag should be in the line-of- sight to a reader. The RFID reader is capable of scanning the RFID tag if it is within the range of the reader. The reader consists of a RF module which behaves as the transmitter and receiver for the radio signals. The transmitter itself is a combined unit of oscillator, modulator and an amplifier.

(a)



(b)

(c)



(d)

Fig.2Components used in the Proposed Prototype (a) GSM SIM900 (b) load cell (c) RFID Reader (d) Pin diagram of PIC 16F877A

The modulator impinges the data command upon the carrier signal created by the carrier signal created by the oscillator. The boosting of the signal is over by the amplifier so that taken the signal can awaken the tag. The microprocessor stores the data and it is the control unit which employs an operating system and memory. The reader employed in this system operates at a frequency of

Volume 4 Issue VI, June 2016
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

about 125 KHz.

C. GSM- SIM 900

Global System for mobile Communication provides user authentication to ensure the communication in wireless system secured. The microcontroller is interfaced with the GSM and the controller allows the GSM modem to communicate over the mobile network. GSM permits sending and receiving messages as it supports “Extended AT command set”. GSM SIM 900 is allied by an L- shaped big package which exhausts the voltage of range 3.4V to 4.5 V.

D. Algorithm

1) To initiate the process show the RFID smart card to the Built-in RFID reader.
2) After the detection of authorised card the process continues.
3) Enter the four digit pin password using keypad.
4) Process continues if the entered password is correct or it will be terminated.
5) Scan the thumb finger into the biometric finger print scanner.
6) If the finger print matches the finger print in the government database, the process continues or the session will be terminated by sending the message to the card holder as the unauthorized usage of his/her card.
7) The process continues by showing the type of products and quantity allotted to that card.
8) Select the required type and quantity of the product given in the list using keypad.
9) The selected product will be delivered to the consumer through the product dispense value with accurate weight.
10) The product stock database of the government will be updated usingGSM.
11) The purchased information of the product will besend to the consumer mobile through SMS to the registered phone number.

E. Work Flow

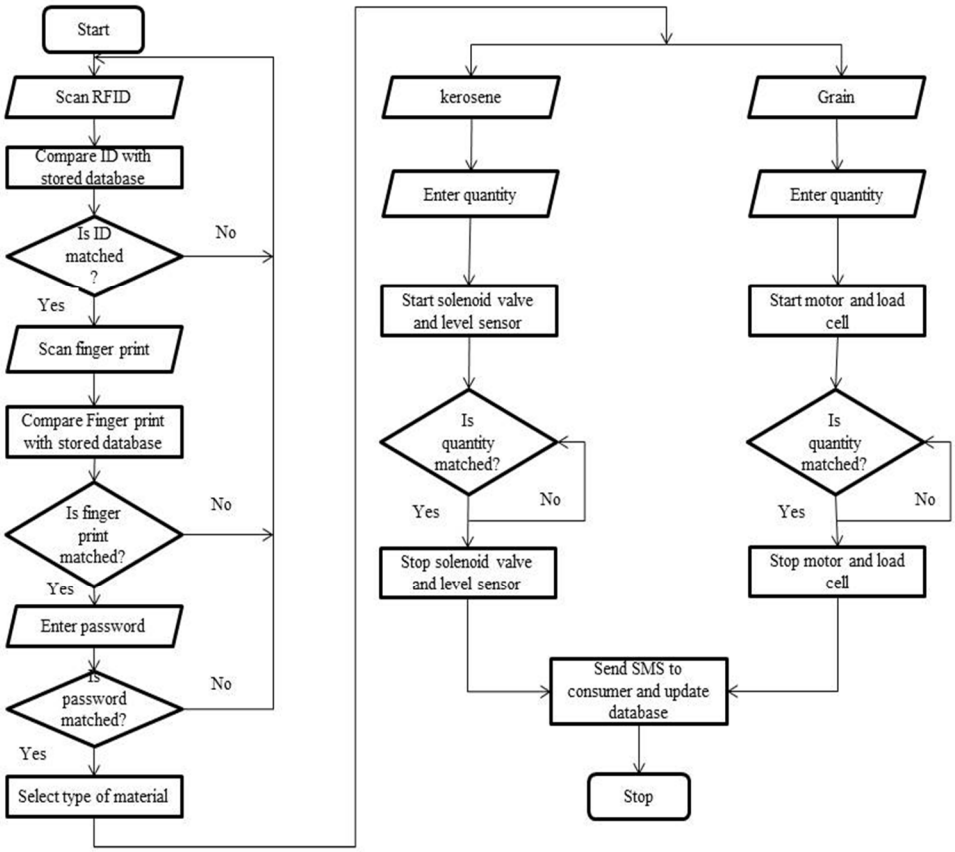


Fig.2: Flow Chart of fair shop vending machine

Volume 4 Issue VI, June 2016
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

The flow show the working flow of the operation carried out in the vending machine.

F. Application

The following images shows the output of the proposed system by delivering the rice and kerosene as the sample, and also the screen shot of the message received by the consumer about the details of purchase.

Fig.5: Dispense of rice

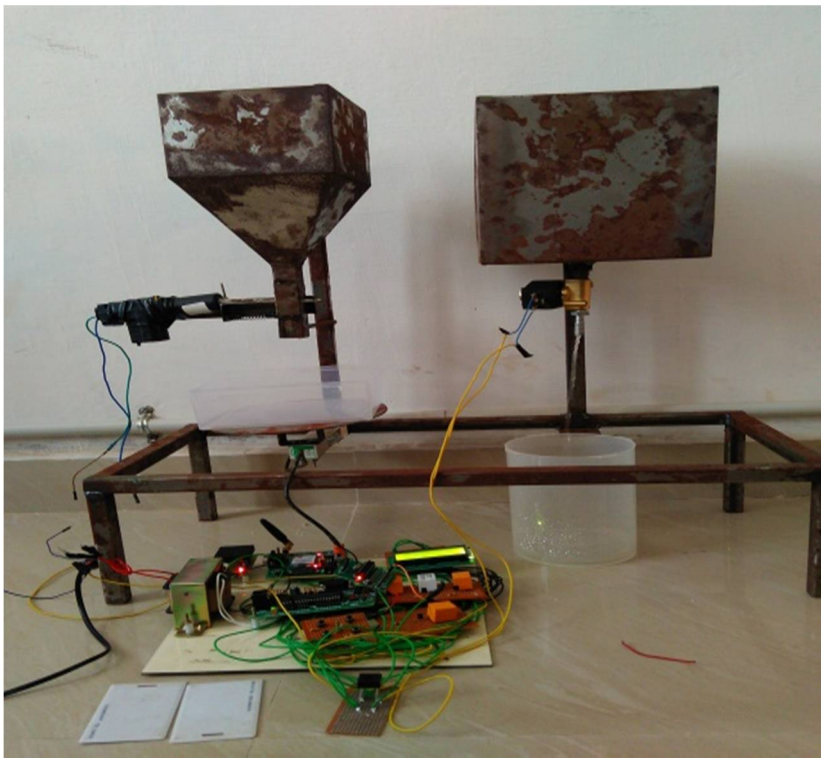


Fig.6: Dispense of kerosene

Volume 4 Issue VI, June 2016
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

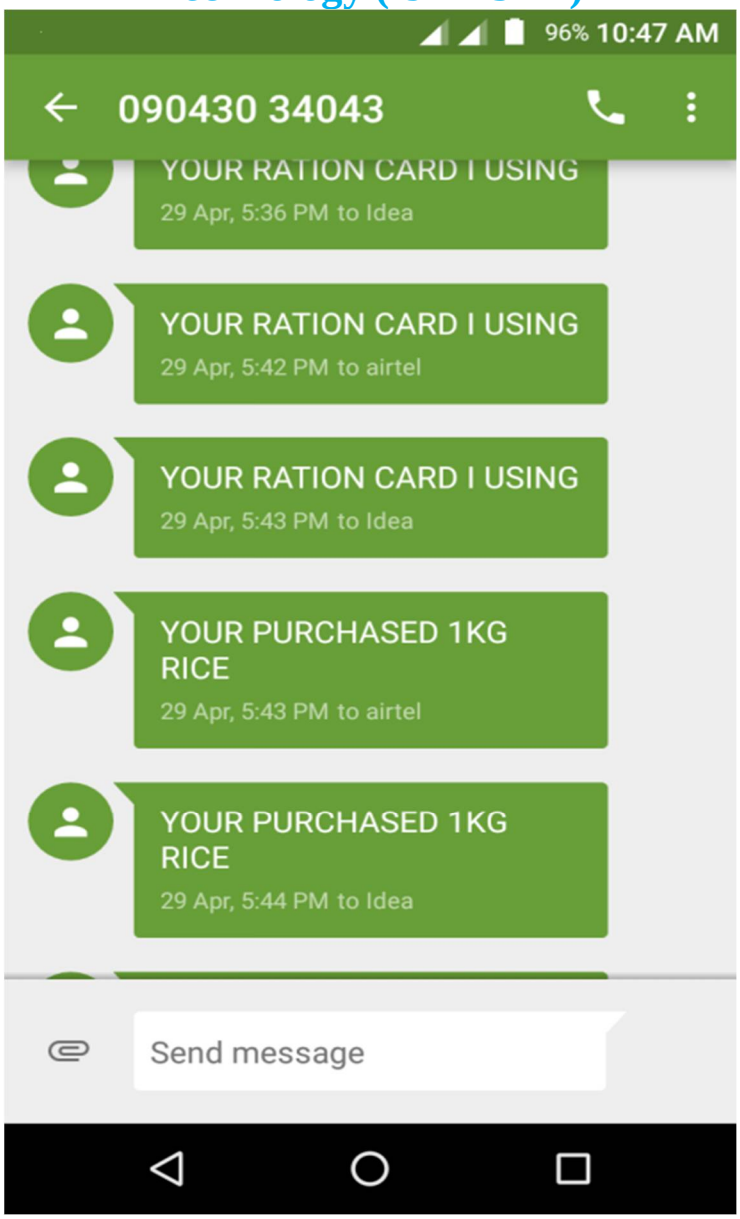


Fig.6. Screenshot of received message

IV. RESULT AND DISCUSSION

Thefair price shop automated vending machine design using RFID and GSM communication technology is used for distributing the solid and liquid materials in the ration shop efficiently and automatically using modern techniques.

This machine works by showing the RFID tag provided to the consumer by the government, when the RFID tag is recognized by the RFID reader, the consumer is allowed to continue the next authentication process or will be terminated, the next step isto enter the password using keypad and thumb finger print using the finger print scanner for the authentication process, if the entered details is not found true the session will be terminated, once the authentication is completed, the consumer is allowed to select the type and quantity of the ration product from the LCD screen using the keypad by entering the desired number, then the selected product will be delivered to the consumer through the product outlet and the database of the government is updated withthe purchased information and the message of purchase of product is send to the consumer mobile through SMS.

Fig.3: Hardware Setup

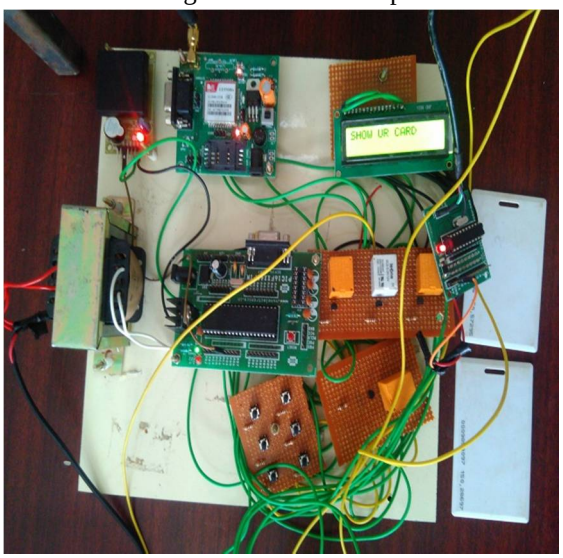


Fig.4: Controller unit

V. CONCLUSION

This project focuses on design and implementation of the fair price shop automated vending machine design using RFID and GSM communication technology, which eliminates the two major drawbacks of conventional ration system namely, the in-appropriate quantity of products and making of fake entries, material hijacking, card piracy, black market and human errors. This project is low cost, low power consumption and more accurate suited for real time implementation.

VI. AKNOWLEDGEMENT

We would kindly like to thank the Department of Electrical and Electronic Engineering of Anna University Regional Office, Coimbatore.

REFERENCES

[1] Swati R.Zope, Prof.MarutiLimkar, "RFID based Bill Generation and Payment through Mobile", International Journal of Computer Science and Network (IJCSN) Volume 1, Issue 3, June 2012 www.ijcsn.org ISSN 2277-5420

[2] U.P.KumarChaturvedula, "RFID Based Embedded System for Vehicle Tracking and Prevention of Road Accidents", International Journal of Engineering Research & Technology (IJERT) Vol.1 Issue 6, August - 2012 ISSN:2278-0181

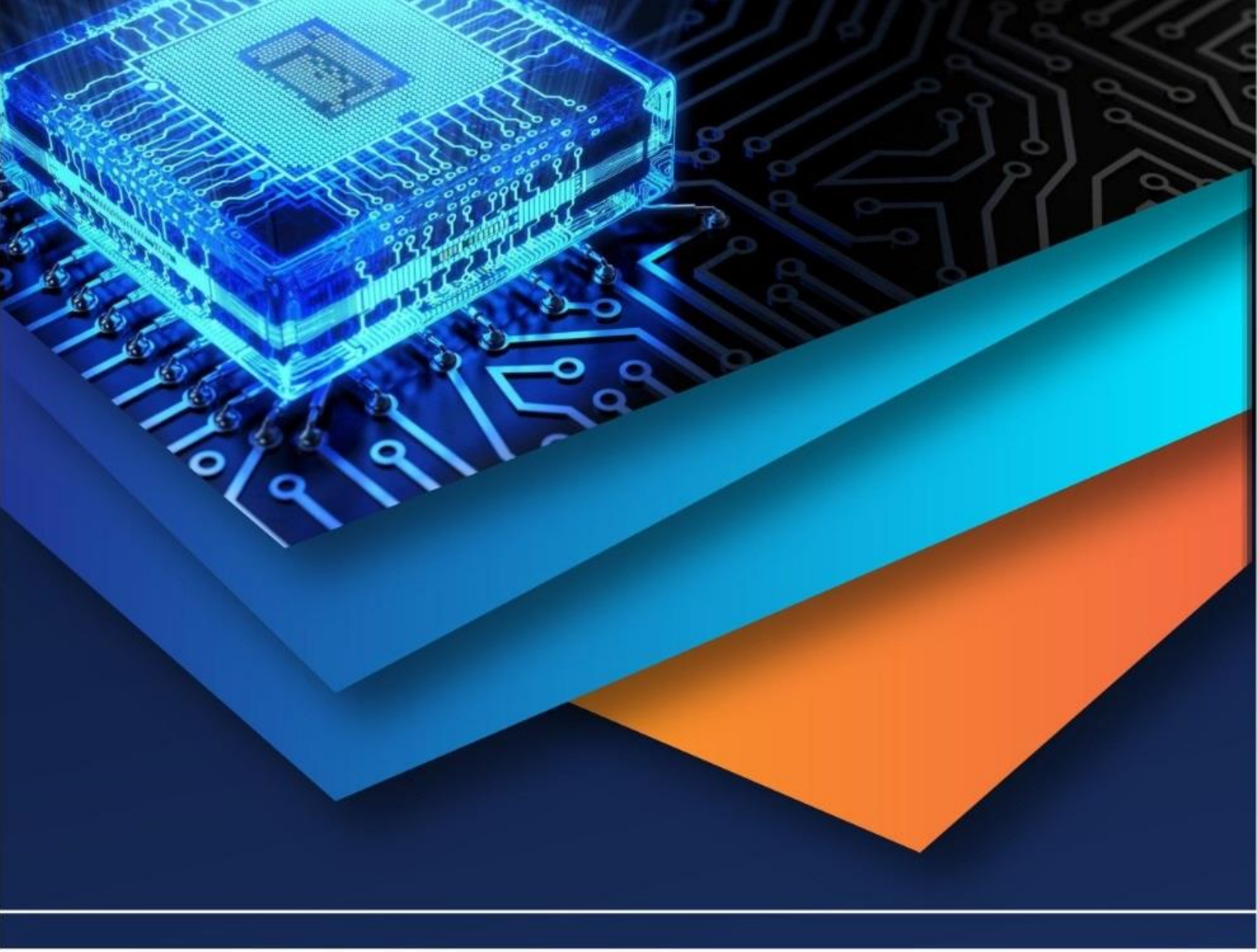
[3] A Parvathy, VenkataRohit Raj Gudivada, MVenumadhav Reddy, G.Manikanta Chaitanya, "RFID based exam hall maintenance system", IJCA Special Issue on "Artificial Intelligence Techniques - Novel Approaches & Practical Applications" AIT, 2011

[4] Rubananth,Kavitha.T, "GSM based RFID approach to Automatic Street Lighting system", journal of theoretical and applied information technology 30th april 2012. Vol. 38 no.2, ISSN:1992-8645.

[5] Magnus Pettersson, The Match On Card Technology, Precise Biometrics White Pape

[6] Ricardo GarcíaNoval, Francisco Perales López, Poster: Adaptative Templates In Biometric Authentication

[7] Lucas Ballard, Seny Kamara, K.Michael Reiter, The Practical Subtleties Of Biometric Key Generation, 17th Usenix Security Symposium
[8] C. Chen, R.N.J. Veldhuis, T.A.M. Kevenaar, A.H.M. Akkermans, Multi-Bits Biometric String Generation Based On The Likelihood Ratio, IEEE, 2007
[9] A.N.Madur, Sham Nayse, "Automation in Rationing System Using Arm 7," International journal of innovative research in electrical, electronics, instrumentation and control engineering, vol.1, Issue 4, Jul 2013.
[10] Rajesh C. Pingle and P. B. Boroley, "Automatic Rationing for Public Distribution System (PDS) using RFID and GSM Module to Prevent Irregularities" HCTL Open International Journal of Technology Innovations and Research, 2013, Vol. 2, pp. 102-111.
[11] S.Valarmathy, R.Ramani, "Automatic Ration Material Distributions Based on GSM and RFID Technology" International Journal Intelligent Systems and Applications, 2013, Vol. 11, pp. 47-54.
[12] K.Balakarthik,"Closed-Based Ration Card System using RFID and GSM Technology,'' vol.2, Issue 4, Apr 2013.
[13] Dhanoj Mohan, Rathikarani, Gopakumar, "Automation of Ration Shop Using PLC" International Journal of Modern Engineering Research, 2013, Vol. 3, Issue. 5, pp. 2971-2977.
[14] S. Sukhumar, K. Gopinathan, "Automatic Rationing System Using Embedded System Technology" International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering, 2013, Vol. 1, Issue 8, pp.339-342.
[15] Yogesh Kumar Sharma, K. B. ShivaKumar, "Multi-Modality Biometric Assisted Smart Card Based Ration Distribution System" International Journal of Application or Innovation in Engineering & Management, 2014, Vol. 3, Issue 6, pp. 382-392.
[16] KashinathWakade, Pankaj Chidrawar, Dinesh Aitwade Smart Ration Distribution and Controlling International Journal of Scientific and Research Publications, Volume 5, Issue 4, April 2015.
[17] www.indiaenviornmentportal.org.in
[18] en.wikipedia.org/wiki/Ration_card



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY