RFID-GSM Based Automatic Rationing System

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Abstract-The process of distributing rations is lengthy and involves entering information of the Ration card or Aadhar card and providing biometric authentication. Only then the ration can be issued and there is a problem that only members registered in the ration card are permitted to pick them up because only they can verify the authentication. As a result, many people lose their goods when they are out of the state or under any emergency situations. So, we proposed a new system RFID-GSM based automatic rationing system. In this method the system employs RFID tags assigned to each ration cardholder, containing unique identification information. When a cardholder approaches the ration distribution point, the RFID reader scans the RFID tag, retrieving the user's details from a centralized database. Subsequently, the GSM module sends the real-time information to the registered user about the process. In this "AUTOMATIC RATIONING SYSTEM" we introduced two methods, first one is using the RFID based ration card and we have to verify the finger print. Second method is using real-time verification through mobile using GSM module. this second method can be accessed by any person if they have our ration card.

Keywords- Arduino UNO, RFID-RC522, GSM, Fingerprint Module, LCD display, toggle switch, RFID tags

I. INTRODUCTION

In this section, we are going to provide a brief introduction about automatic rationing for public distribution system (PDS) using RFID and GDM module. In a highly populated and developing nation like India, one of the main problems we are facing is distribution of ration time main consequences we are facing during this are more time taking in queues and sometimes invalid authentication. when we are out of the state we cannot take ration So, using this method we can overcome these problems and also members who are not linked to our ration card can also take the supplies with our real-time authentication using mobile and to use this method the other member should have our RFID based ration card and after scanning we will get a verification message and we have to verify then the supplies are provided. and the first method is normal regular method and after scanning we have to verify our fingerprint this fingerprint can be verified only by the family members. During this process we will get real time updates to the registered mobile number using GSM module So, that we can prevent any unauthorized access by entering a code.

II. OBJECTIVE

The main objective of this project is to reduce the efforts of people mainly at urban areas while taking ration supplies. As compared to rural areas taking ration is a bigger task in urban areas because of more waiting time and sometimes the server will be slow to display the information. So, we want to implement this RFID-GSM based automatic rationing system to make the distribution process more accurate and ensuring the goods reach the beneficiaries. The advantage of this system is anyone can obtain our goods like relatives or friends when we are unable to take the goods. This can be achieved by using real-time mobile verification from the registered user.

III. LITERATURE SURVEY

Literature review was carried out throughout whole project to gain knowledge needed to make this project.

In paper [1], Conventional ration card is replaced by smartcard in which all the details about users are provided including their AADHAR (social security) number which is used for user authentication. This prompted us to interface smart card reader (RFID Based) to the microcontroller (AT89C51) and PC via RS232to develop such a system. Using such a system,

Government would have all required control/monitoring over the transactions at ration shop. To involve government in the process we proposed connecting the system at ration shop to a central database (provided by government.) via GSM module (SIM900D) and RS232.Hence it is possible to prevent the corruption and irregularities at ration shop. This would bring the transparency in public distribution system and there will be a direct communication between people and Government through this.

In paper [2], System is to reduce forgery from ration shops and users will get their grocery in easy way. Also, to reduce manual work. In this system we will develop the smart ration card system based on the RFID and the BIOMETRICS, in which the user can fill their data online. And also, the manual working is not there. When user wants a ration, he/she comes with the Smart ration card, then the card is swipe and check whether the user is valid or not. The fingerprints of that user also check and the allocated ration is distributed to that particular user, changes of adding and issuing of ration is done automatically in the government database.

In paper [3], Ration card plays a vital role for the household details such as to get gas connection, family member details; it acts as address proof etc. In this paper, we have proposed a smart ration card system using Radio Frequency Identification (RFID) Technique and IOT to prevent the malpractices and corruption in the current ration distribution system. In this system conventional ration card will be replaced by a unique RFID tag. This RFID tag will be verified at the fair price shop for the authentication of the user. The user's identity will be verified by microcontroller which is connected to an Amazon Web Services (AWS) database. For added security One Time Password (OTP) is also sent to user's registered mobile number which needs to be entered in the system.

In paper [4], Cloud-Based Ration Card System using RFID and GSM Technology", Presents an efficient method for the user to buy the products in the ration shop by just flashing the card at the RFID reader at the ration store. The user authentication is done by sending a random password text to the user mobile which has to be entered in a keypad. The purchase is validated by the employee only after the details are entered in a windows application which stores the

user's personal and purchase information. Here the user can check their purchase details in a dedicated website.

In paper [5], The client must sign up for the application in the built framework using the user's name and password that are accessible via the email address. The RFID tag should be validated before an RFID scan at the point where the customer enters the proportion store. For the exact weighing of grain and gas, a burden cell and an IR sensor are utilized separately.

In paper [6], The goal is to use smart cards based on the Aadhaar card application to streamline the distribution of rations. This solution uses a concept device based on an ATM computer. Customers can get a reliable and immersive ration delivery automation plan using this method. All relevant data, including name, phone number, address, bank account numbers, biometric data, are contained on the Aadhaar card. The central database created by the policy authority houses customer records

In paper [7], It says RFID cards aren't ration cards instead, they contain the majority of the account holder's details, including personal data, the type of card and its authenticity, etc. The customer allocates the grains by scanning their RFID card.

In paper [8], It was suggested to employ GSM and RFID technology in place of ration cards to provide electronic ration products. The RFID sticker must be inserted into the RFID scanner before the manager may scan the customer codes and descriptions of the amounts in the wallet and obtain the goods from the ration shops

IV.IMPLEMENTATION

From the Fig1, it represents that for Arduino board RFID reader is connected and when we scan a card at RFID reader then if it is a valid card then on the LCD display it will show us to provide finger-print. While this process started we will be updated to our mobile using GSM module and after the successful verification of finger-print we will be provided the ration goods only the users who are pre-registered in the ration card or RFID can only verify the finger-print. After the verification of fingerprint, we will receive a message. This method is basic method, the most application of this system is people other than registered users can also take the goods upon successful mobile verification from the registered user. This can be done when we choose method 2 for

authentication this method can be switched using toggle switch. While using method 2 first we have to scan the RFID tag then upon scanning a verified RFID tag the GSM module will send a message to the registered user, then the user needs to send some verification code to the system which was pre-assigned. When the received code is verified by the system is valid then the LCD displays the information and the person can receive goods. If we lost our card and someone tries to access our card then we have to send some another pre-assigned code to the system or we shouldn't reply the code then the goods will not be dispensed
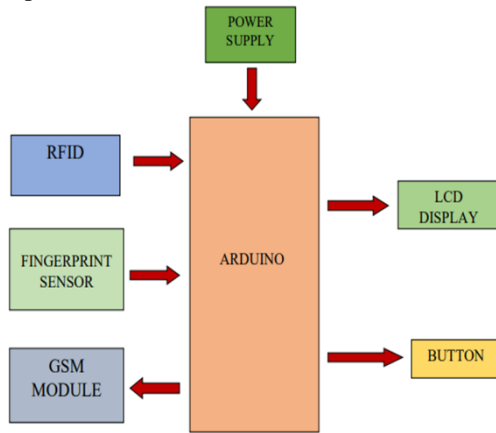

Fig 1: Block Diagram of System

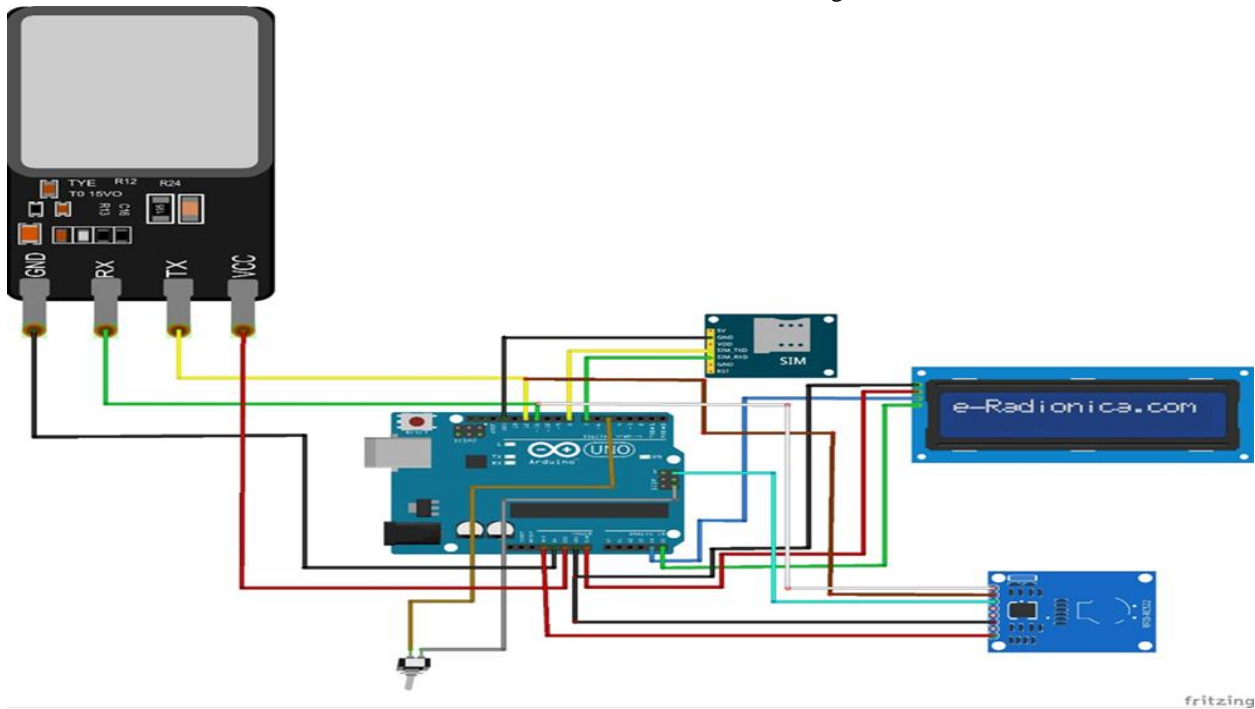From the fig 2: it shows the software implementation

of the system in this all the components are connected to Arduino UNO, Initially the finger-print sensor is use to identify the particular person details when they used to put the fingerprint on the sensor, it will store the person's data and it will be connected to the Arduino Uno to transmitter and receiver which is used for data transmitting and receiving. Whenever the data is identified then ration portal become activate, exactly the same for RFID and GSM is used to send the message to the person whose contact is connected to this RFID and GSM. The RFID is connected to the transmitter and receiver of fingerprint module which is also connected to the 13th 12th pins of Arduino, the black wire is connected to the ground and red wire connected to the 3volts. In fingerprint sensor Vcc is connected to 5volts and black wire is connected to ground, this whole process is help of interaction between microcontroller and GSM ,SIM is used for details of the person, in this the transmitter is connected to the 8th pin and receiver Is connected to the 7th pin and ground is connected on Arduino which we see in the figure .Toggle switch is used to on and off the circuit .The LCD is used to notify the whole process and display on the screen ,two pins of LCD is connected to the analog pins A4 ,A5 of Arduino ,one pin is connected to Vin and other one is connected to ground .This is the whole working of the above mentioned diagram

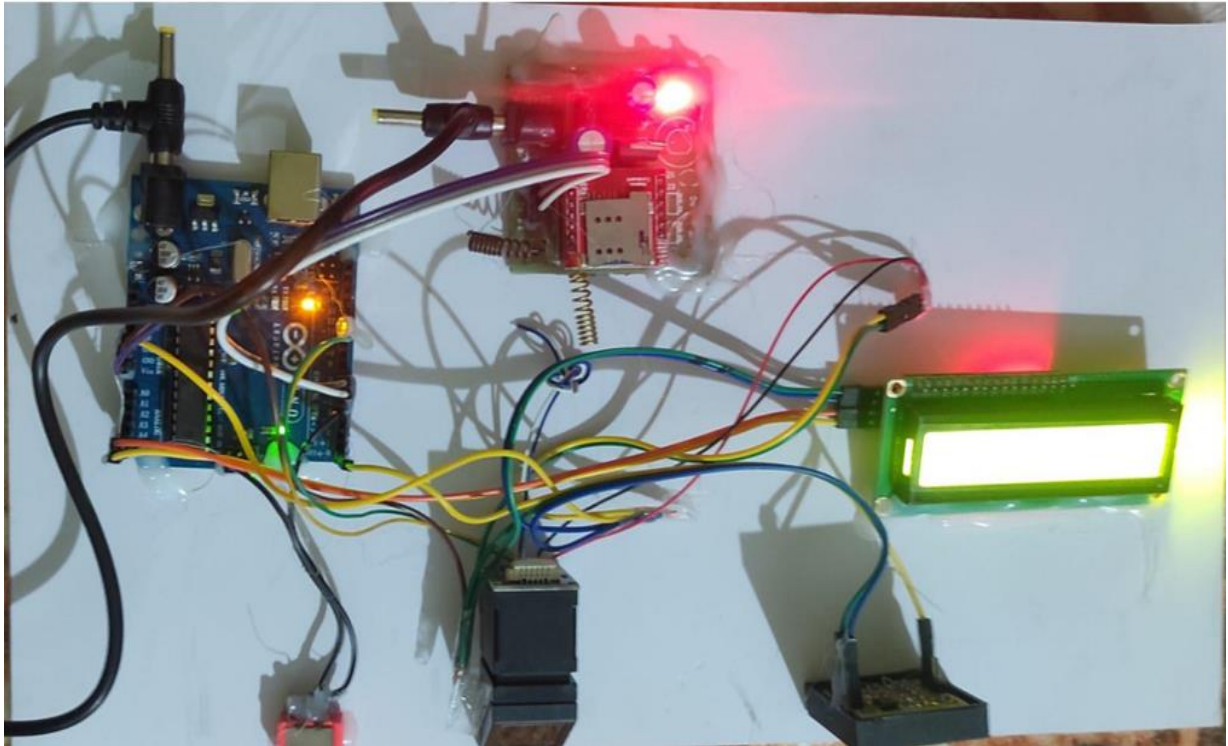Fig 2: Software Implementation of System

V. RESULT

Fig 3: Hardware Implementation of System

CONCLUSION

The conclusion of the RFID GSM-based automatic rationing system stands as a pivotal solution in enhancing the efficiency and transparency of ration distribution. By seamlessly integrating RFID technology and GSM communication, this system ensures accurate tracking, timely updates, and secure distribution of essential commodities. The amalgamation of these technologies not only streamlines the rationing process but also mitigates the risk of fraudulent activities, ultimately contributing to a more accountable and accessible welfare system. As we move forward, the continual refinement and widespread implementation of such innovative systems promise to revolutionize how societies manage and distribute essential resources. Through this, we have made intent to introduce a new technology which helps to remove the wrongs of the existing system and also has its own advantages which are useful for other applications. After some years government may introduce a scheme that people can take ration all over the country. It acts as an anticorruption tool as it reduces corruption to a great extent, which was one of the primary reasons we thought of while coming up with the idea.

FUTURE SCOPE

The future scope of the RFID GSM-based automatic rationing system is promising, with several avenues for further enhancement and application. Firstly, integration with advanced data analytics can provide valuable insights into consumption patterns, allowing for more accurate demand forecasting and resource allocation. Additionally, exploring the potential integration of biometric authentication could further enhance security and prevent unauthorized access to rationed goods. Furthermore, incorporating IoT (Internet of Things) capabilities can extend the system's reach, enabling real-time monitoring and control of inventory levels. This could facilitate proactive measures in addressing shortages or surpluses efficiently. Collaborations with mobile payment systems can also be explored, introducing cashless transactions to streamline the distribution

process and reduce dependency on physical tokens. As technology continues to evolve, exploring possibilities for incorporating blockchain can enhance the system's transparency and traceability, ensuring an immutable record of transactions. Moreover, considering scalability to a larger regional or national level would contribute to a more comprehensive and inclusive distribution network. In the broader context, research and development efforts should focus on making the system more resilient to cybersecurity threats, ensuring the integrity and confidentiality of sensitive data. Continuous user feedback and engagement will be crucial for refining user interfaces and addressing any usability concerns. In summary, the future of the RFID GSM-based automatic rationing system lies in embracing technological advancements, expanding its functionalities, and adapting to the changing needs of society. Through ongoing innovation and strategic partnerships, this system has the potential to play a pivotal role in shaping more efficient and equitable ration distribution systems globally. The application of this particular improvement is the present working of the ration shops has a lot of scope in various other areas apart from being introduced only to this particular domain. This particular system can be scaled up to for a large number of items which can be selected from one controller itself. Also, the technology introduced can be used in various places like malls, supermarkets, etc. As there is ease of access, it can remove the constraint on time for various types of applications. So, the users have 24x7availability. This can prove to be a profit to some organizations and they may opt for installing such a system.

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