IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

ISO 3297:2007 Certified ⁜ Impact Factor 8.066 ⁜ Peer-reviewed / Refereed journal ⁜ Vol. 10, Issue 4, April 2023

DOI: 10.17148/IARJSET.2023.10441

TAMPER PROOF RATION DISBURSEMENT SYSTEM FOR RURAL AREAS

Amulya. R[1], Manu N. Kandra[2], Gayathri. R . Warrier[3], B Sudarshan[4], Jagruti. Pai[5]

ECE, K S Institute of Technology, Bengaluru, India[1,2,3,5]

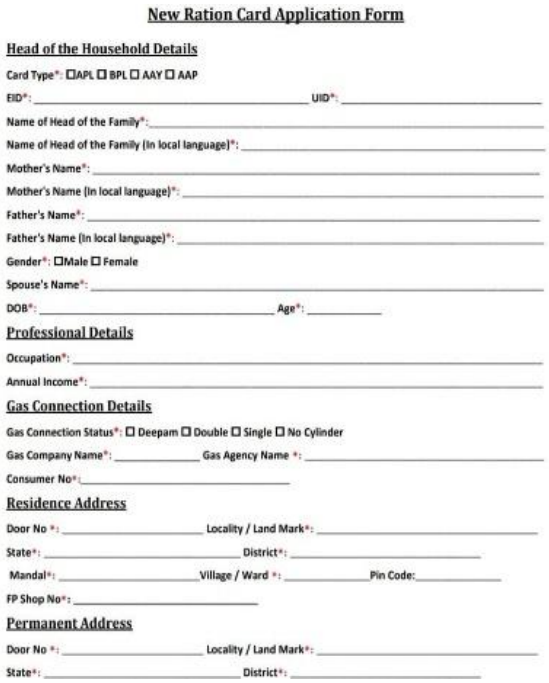
Professor, ECE, K S Institute of Technology, Bengaluru, India[4]

Abstract: Traditional ration card system has evolved as a system of management of scarcity of food grains through the distribution of food grains at affordable prices. Over the years ration distribution has become an important inseparable unit of the government's policy to ensure that sufficient food grains have been supplied. However, Traditional units have undergone significant turnovers in terms of fraud, theft, and interference from middlemen. To overcome the above scenarios, we have initiated the development of our project that will contribute to digitizing the entire distribution unit such that there will be no room for fraud. The operation facility includes allocation within the state, identification of eligible families, issue of ration cards according to the database, and supervision of the functioning of fair price shops. Presently under the distribution system commodities namely wheat, sugar, oil, and kerosene are being allocated to the states for distribution.

Keywords: RFID, OTP, Firebase, MIT App Inventor.

I. INTRODUCTION

The government provides food, oil, and fuel to economically challenged people at subsidized rates, distributed to the public through ration shops. They also fix an upper limit on the consumption per head. For this, they get a form filled out that looks something like the Figure. Also, a sample form has been attached to this document, which must be filled out to get the ration card issued. Here the personal details of the family are noted and then they are issued a ration card which also acts as nationality and address proof for the citizens of India. The modus operandi for these ration shops is that the material is bought from the farmers and then sold at subsidized rates. Every month fresh stock arrives. these shops and that needs to be disbursed to the public. Typically, the ration shop owners play foul, and the right amount is not disbursed or disbursed to unauthorized people or sold out at higher rates. To counter these fouls government is taking some measures like introducing smart cards. However, this can also be circumvented by the wrongdoers and use the same card for issuing to unauthorized people as the card owner need not be present at the time of the ration disbursement.



New Ration Card Application Form

Head of the Household Details

Card Type*: ☐APL ☐BPL ☐AAY ☐AAP

EID*: _____ UID*: _____

Name of Head of the Family*: _____

Name of Head of the Family (In local language)*: _____

Mother's Name*: _____

Mother's Name (In local language)*: _____

Father's Name*: _____

Father's Name (In local language)*: _____

Gender*: ☐Male ☐Female

Spouse's Name*: _____

DOB*: _____ Age*: _____

Professional Details

Occupation*: _____

Annual Income*: _____

Gas Connection Details

Gas Connection Status*: ☐ Deepam ☐ Double ☐ Single ☐ No Cylinder

Gas Company Name*: _____ Gas Agency Name *: _____

Consumer No*: _____

Residence Address

Door No *: _____ Locality / Land Mark*: _____

State*: _____ District*: _____

Mandal*: _____ Village / Ward *: _____ Pin Code: _____

FP Shop No*: _____

Permanent Address

Door No *: _____ Locality / Land Mark*: _____

State*: _____ District*: _____

Fig 1.1 New ration card application

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

ISO 3297:2007 Certified ⁜ Impact Factor 8.066 ⁜ Peer-reviewed / Refereed journal ⁜ Vol. 10, Issue 4, April 2023

DOI: 10.17148/IARJSET.2023.10441

Fig 1.2 Undated chart with prices in a ration shop

In India, every Indian family is issued a Ration card by the Government of India and the families are to receive concision in food grains as per card. Quantities of food grains are ensured that they will be fixed in terms of monthly requirement based on the income and expenditure of a particular family depending on the number of people residing in the family.

Fig 1.3 Manual distribution of ration in a ration unit

The present units involve the typical use of ration cards or fingerprint scanner units to facilitate the distribution of the food grains to the respective allotted user.

II. LITERATURE SURVEY

The present-day is a year filled with many immoral activities that are the key reason for the fraud happening in the ration shops, which are meant to segregate and distribute all the goods and commodities to the people who are majorly below the poverty line. The process of distribution has been manually operated and the effect of which has made it consume a lot of time and waste energy resources. To overcome this situation government has initiated the traditional ration distribution unit to an RFID-based unit that facilitates the distribution of food grains effectively. A typical ration card system has RFID tags that incorporate the database of the buyer including the family details of which the grains have been distributed effectively.[1] Nowadays, corruption has been found on the grounds of every society right from politics to society. The root cause behind this corruption is the manual work that is the paperwork, recordings of databases, information, and records of photocopy that in turn has risen to irregularities of audits and maintenance of the existing database. The work that has been proposed has made use of the GSM-incorporated RFID cards to gather and provide access to all the information.[2] Ration Distribution in India is not an easy task. The important problems of this system are the eligible are unable to ration distribution system resulting in leakage of subsidies. Automated smart rationing distribution will be in the country needs and necessity of the fashion world and also human beings. The ration goods distribution is not an easy way for every family to buy the products provided by the government authority monthly by using smart cards.[11] The Public Distribution System in India is the largest retail system in the world. The major problem in this system is the inefficiency in the targeting of beneficiaries, improving weighing machines used, and illegal selling of goods. The automated public ration distribution system aims to replace the manual work in Public Distribution System thereby reducing corruption and illegal selling of stock. This paper gives a review of the E- Ration card system to distribute grains automatically. The proposed system is used the conventional ration card which is replaced by a smart

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

ISO 3297:2007 Certified ⁜ Impact Factor 8.066 ⁜ Peer-reviewed / Refereed journal ⁜ Vol. 10, Issue 4, April 2023

DOI: 10.17148/IARJSET.2023.10441

card using an RFID card.[3] The Ration Card is mostly used as recognizable proof for acquiring financed foodstuff and fuel. It is used as proof for acquiring a passport, Aadhar card, and other documents as an address confirmation for residents of India. The Ration distribution system has numerous disadvantages, for example, mistaken amounts of merchandise, manual work, low preparation speed, expansive holding up time, and repetitive data.[9] Automation provides optimized solutions to all problems in the distribution of water systems. [4] with a small number of constraints. The public Distribution System (PDS) is an Indian food security system. Established by the government of India under the Ministry of Consumer Affairs, Food, and Public Distribution and managed jointly with state governments in India, it distributes subsidized food and non-food items to India's poor. Major commodities distributed include staple food grains, such as wheat, rice, sugar, and kerosene, through a network of public distribution shops, also known as Ration shops established in several states across the country. Food Corporation of India, a government-owned corporation, procures and maintains the Public Distribution System.[5]

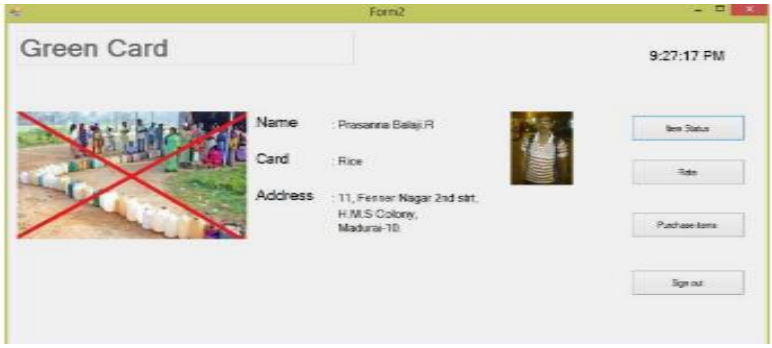


Fig 2.1 Green card system

A ration card is one of the authenticated documents that has been issued and implemented by the government of India to every single family. This card acts as identity proof for a particular individual user for monthly reservation of food grains from a particular ration distribution system. This ration card system identifies every member concerning gender, identity, and photographs.[6]

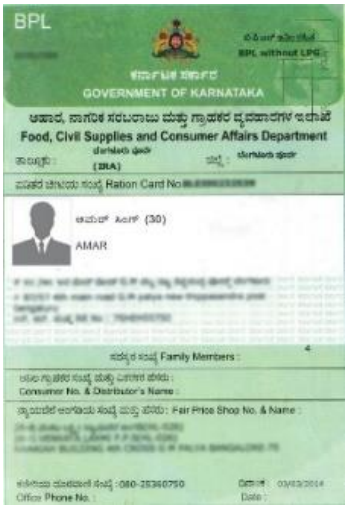


Fig 2.2 Ration card

Another typical upgradation utilizes the aspects of a power electronics-based smart transformer is becoming a reality that can be used to upgrade the distribution network to make it very active probably allowing a bidirectional transfer of power flows that is capable of accounting for the storage of food grains making it an intelligent distribution network.[7]
The resources in the world are finite and the desire for resources is infinite. One of the largest retail systems in the world is India's public distribution system. The manual work involved and the lack of automation make this system inefficient. The conventional ration card system is replaced by an automatic rationing system. This system uses authenticated fingerprint detector to provide products to the users. When suitable input has been provided, the products are obtained

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

ISO 3297:2007 Certified ⁜ Impact Factor 8.066 ⁜ Peer-reviewed / Refereed journal ⁜ Vol. 10, Issue 4, April 2023

DOI: 10.17148/IARJSET.2023.10441

from an automated ration shop. This system provides products with accurate weight and unnecessary selling of goods can be avoided. The ration shop is connected to the government via GSM to prevent irregularities in ration distribution.[8]

Fig 2.3 Fingerprint ration distribution

A typical fingerprint scanning unit includes finding a match between the human fingers to refer to a particular identification unit that typically involves enrollment and subsequent searching.[9] Growing technology has provided its major contribution to meeting the fundamental needs through the subsidy provided by the government of India based on domestic conditions. These circumstances have always involved ration shops incorporating intense labor dependency. However, there has been significant identification of fraud and malpractices due to human interference in updates and transactions. This can be in the form of overcharging or black theft marketing. The IoT-based smart unit was proposed to automate the dispensing based on the existing database and thus verify the card holders.[10] Public distributions have corruption and smuggling through the given products of the government. The system is based on the GSM and RFID. RFID is used as a smart card and the consumer database is enrolled in the microcontroller. Consumers need to read the RFID card and microcontroller and compare them with the government website. After completing, the verification consumer needs a particular product and quantity of goods provided by the government.[11] a Fingerprint module is used in IoT-based Ration card Systems. It is used for enrolment and verification purposes. It is used to get an image of the finger using an optical scanning process. This has been facilitated to process the obtained fingerprint minutiae algorithm [12]

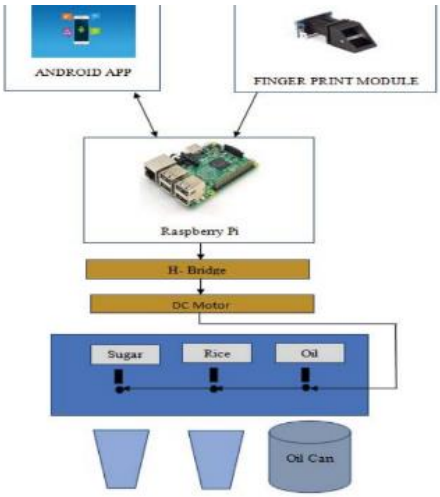


Fig 2.4 IoT ration distribution

As we can recall the current trend of ration distribution has been suffering a lot of significant changes and prominent issues like smuggling and black theft that involve manual irregularities in the measurement of the equipment scenarios. An automated ration system is incorporated to make all the distribution right from the vendor to the customer automatized by maintaining complete transparency in the system and thereby making it more efficient. Arduino ide can be utilized to write the program to store the database of people based on all the details provided by them concerning their adhaar card.[13]

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

ISO 3297:2007 Certified ⁜ Impact Factor 8.066 ⁜ Peer-reviewed / Refereed journal ⁜ Vol. 10, Issue 4, April 2023

DOI: 10.17148/IARJSET.2023.10441

Fig 2.5 Arduino IDE

Stock details are maintained in the PC after distributing the materials an intimation is sent to the government head office with the help of a GSM. Add to cart facility is also provided using which a consumer can directly order their items from home. This method helps avoid crowds, and long waiting periods, and also maintain proper customer and stock details. In case there is theft in the stocks, then anti-theft alarms will be triggered, and even if there is any sort of leakage of grains, an anti-spill alert will be sent to the civil supply shop.[14]

This paper divides the working system into three modules- Admin, Shopkeeper, and Card Holder/Member. The admin has to add schemes like APL, BPL, etc., Later ration shops of different areas are provided with user names and passwords for the shop keepers. To distribute ration the ration admin will add the details of the cardholder and give them a unique password. Next, distribute the Ration, admin allocates slots for the customers of all the areas by sending an SMS that contains the date and time to collect their ration. If some of the customers could not collect their rations then re-slot allocation to collect the ration.[15]

The consumer who needs the goods through the public distribution system the procedure to enter the valid serial number on the government website where all the details of the consumer are displayed based on the serial number entered as already the information is enrolled in the government ration website which then communicates with the microcontroller that is incorporated in the embedded system. The option to choose the language, products, Quantity, and cost of it is displayed. If there is an efficient balance then the amount gets deducted and the goods are dispensed else the system displays insufficient balance and the process is terminated immediately.[16]

The E- ration Distribution system uses Face Recognition and fingerprint verification. This system successfully eliminates the errors due to manual monitoring of ration data as all the data is automatically updated in the database. Also, this system will enable the government to keep track of consumers and their transactions.[17] To provide a solution to the various problems faced, this paper proposes an IoT-based Smart Ration Dispensing System based on Loadcell Feedback. It has a series of containers with feeder inlets to fill the container with ration goods. Each container has an outlet whose opening or closing is controlled by a servo motor wirelessly. A database is created with the customer details along with the phone number. We are using the phone number to verify the customer because all the government-issued ID cards are linked to the phone number along with their image. This eliminates the need to physically carry the smart card which is required in the present system. Using load cells provides high-weight accuracy.[18] When the customer comes, firstly for identification he/she is asked for his fingerprint (if the aadhar card is linked with a ration card), if the aadhar card is not linked with the ration card for identification ration card is scanned, and till the process completes and entry is done in ration card is used. After identification, the details of the consumer are displayed on the screen Next, in the process of distribution, where the customer gets a Graphical, easily understandable pictorial interface in which a commodities chart is placed and prices are shown. The consumer can click on these commodities and pay the amount required and get

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

ISO 3297:2007 Certified ⁜ Impact Factor 8.066 ⁜ Peer-reviewed / Refereed journal ⁜ Vol. 10, Issue 4, April 2023

DOI: 10.17148/IARJSET.2023.10441

these commodities.[19] This machine works by showing the RFID tag provided to the consumer by the government, when an RFID reader recognizes the RFID tag, the consumer is allowed to continue the next authentication process. Once the authentication is completed, the consumer is allowed to select the type and quantity of the ration, then the selected product of the required quantity will be delivered to the consumer through the product outlet. The database of government is updated with the purchased information and the message of Purchases of products is sent to the consumer's mobile through SMS.[20]

III. METHODOLOGY

3.1 BLOCK DIAGRAM

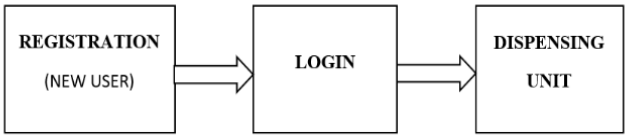


FIG 3.1.1 SYSTEM BLOCK DIAGRAM

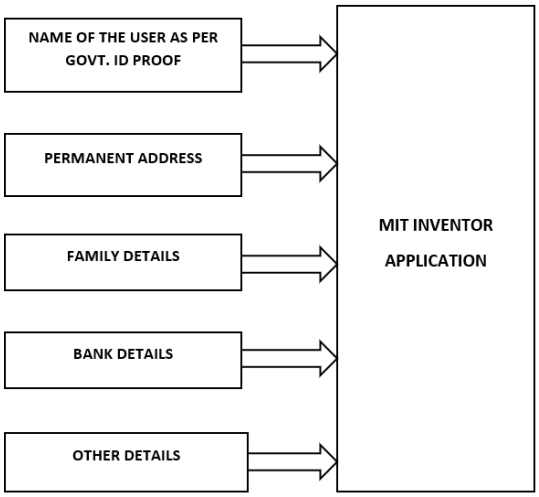


FIG 3.1.2 FRONTEND

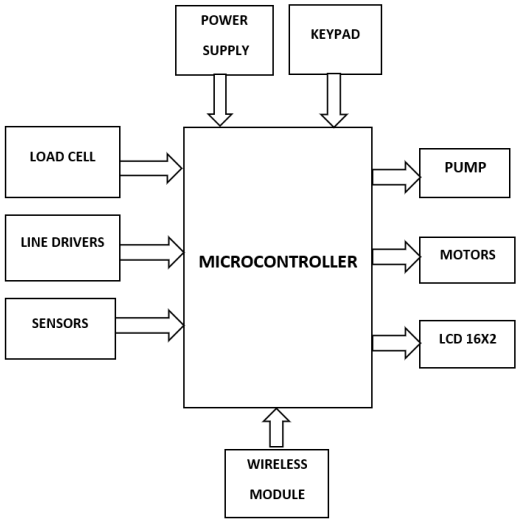


Fig 3.1.3 Dispensing unit

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

ISO 3297:2007 Certified ⁜ Impact Factor 8.066 ⁜ Peer-reviewed / Refereed journal ⁜ Vol. 10, Issue 4, April 2023

DOI: 10.17148/IARJSET.2023.10441

3.2 FLOW CHART

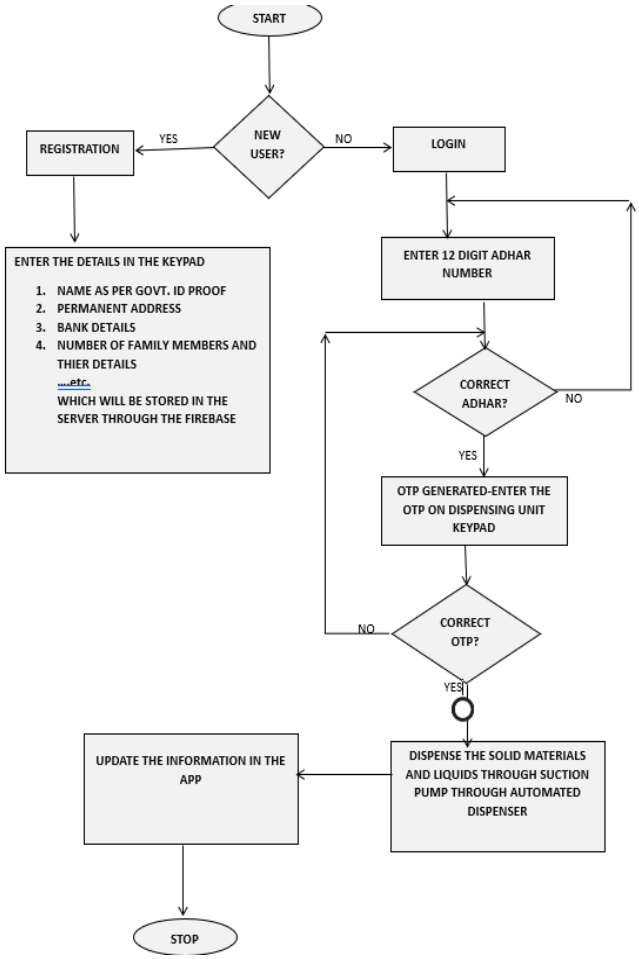


Fig 3.2.1- Flowchart

3.3 WORKING

Automatic ration disbursement using an application refers to the process of using a mobile application to automate the distribution of essential food supplies to eligible recipients. The aim is to ensure that the distribution process is efficient, transparent, and easily accessible to beneficiaries, with minimal human intervention.

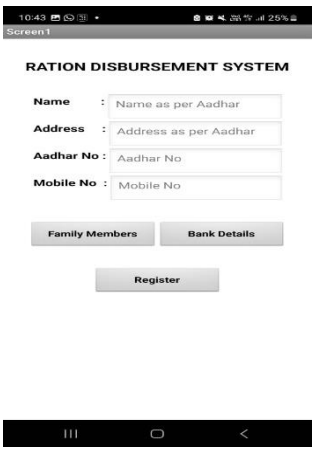


Fig 3.3.1- Registration

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

ISO 3297:2007 Certified ⁜ Impact Factor 8.066 ⁜ Peer-reviewed / Refereed journal ⁜ Vol. 10, Issue 4, April 2023

DOI: 10.17148/IARJSET.2023.10441

Two applications are created using MIT App Inventor, one for the registration and other for login.

Fig 3.3.2- login

During registration, the user must register themselves by entering information such as Name, Relationship, Aadhar number (for mapping), Gender, Bank Details, etc.,

Once the user has registered himself the data is stored in the Firebase. To store data in Firebase from an application, the application needs to integrate with Firebase using the Firebase SDK. Once the integration is complete, the application can then create a reference to the Firebase database and use it to interact with the database.

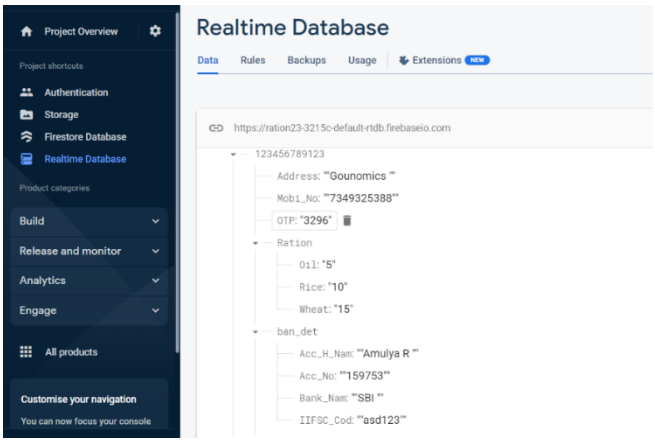


Fig 3.3.3- Database

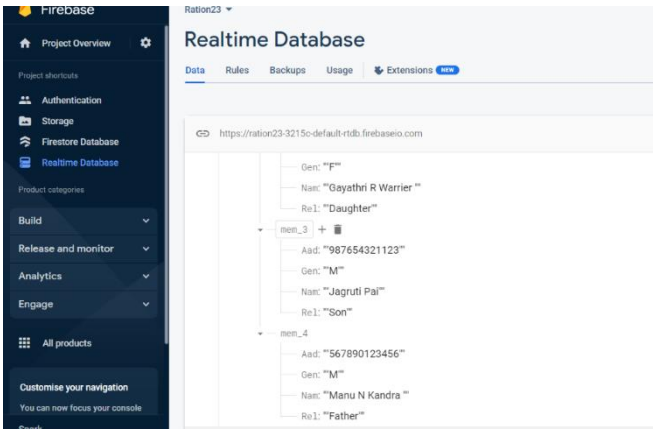


Fig 3.3.4- Family member details

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

ISO 3297:2007 Certified ⁜ Impact Factor 8.066 ⁜ Peer-reviewed / Refereed journal ⁜ Vol. 10, Issue 4, April 2023

DOI: 10.17148/IARJSET.2023.10441

Once the data is stored in the database the login phase begins, the LCDs Enter the aadhaar number and the user has to log in using an aadhar number that has to be entered using the keypad once the Aadhar entered is present in the database the LCDs Enter OTP generated the OTP generated and sent to the registered phone number must be entered using the keypad.

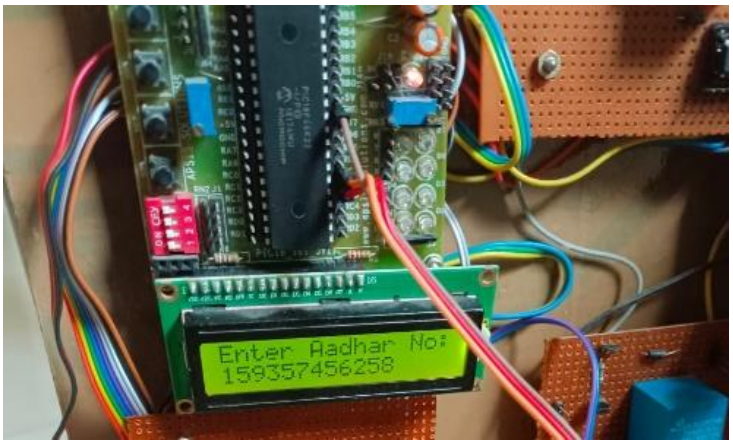


Fig 3.3.6- lcd display

OTP verification and validation are done using ESP32. The ESP32 device connects to the Firebase database and retrieves the OTP stored in Firebase using the methods provided by the FirebaseESP32 library. The entered OTP is then compared with the Firebase OTP to check whether it is valid or not.

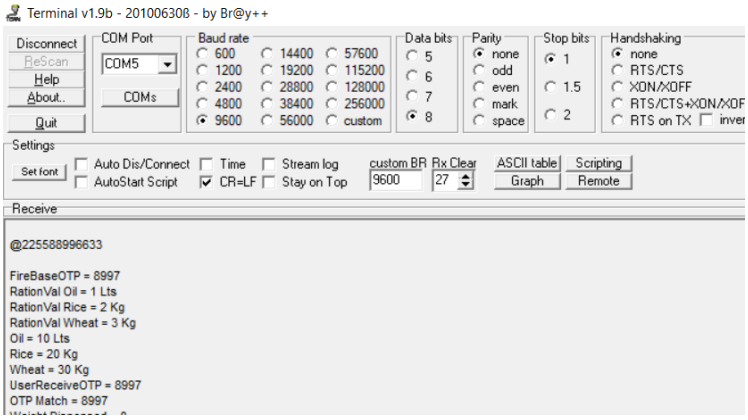


Fig 3.3.7- Teminal window

If the entered OTP matches the Firebase OTP, the validation is considered successful, a message is displayed on the LCD which is OTP matches and dispensing phase begins.

During the dispensing phase, the family details provided during the registration phase are used. The minimum amount assigned is multiplied by the number of family members and is set as a value for dispensing.

The pumps and motors are activated and real-time values are calibrated and compared with the actual set value once the calibrated amount is equal to the actual set amount, motors and pumps are turned off and the data is updated in the firebase as well as in the application.

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

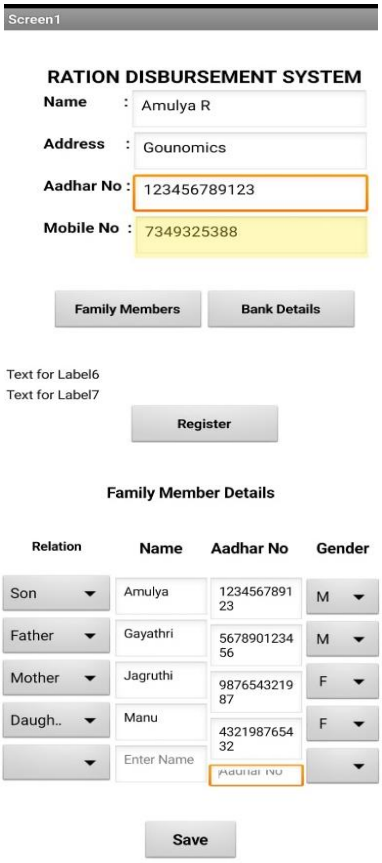
International Advanced Research Journal in Science, Engineering and Technology

ISO 3297:2007 Certified ⁜ Impact Factor 8.066 ⁜ Peer-reviewed / Refereed journal ⁜ Vol. 10, Issue 4, April 2023

DOI: 10.17148/IARJSET.2023.10441

IV. RESULT

The user should first register by giving all the required details.



Once the data is stored, using the login application the user can enter the Aadhar number, and an OTP is generated.

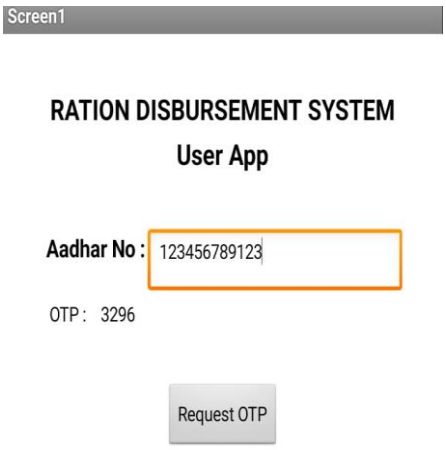


Fig 3.3.7(a)Registration 3.7(b) Login

If the entered OTP is invalid then the LCDs invalid OTP.

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

ISO 3297:2007 Certified ⁜ Impact Factor 8.066 ⁜ Peer-reviewed / Refereed journal ⁜ Vol. 10, Issue 4, April 2023

DOI: 10.17148/IARJSET.2023.10441

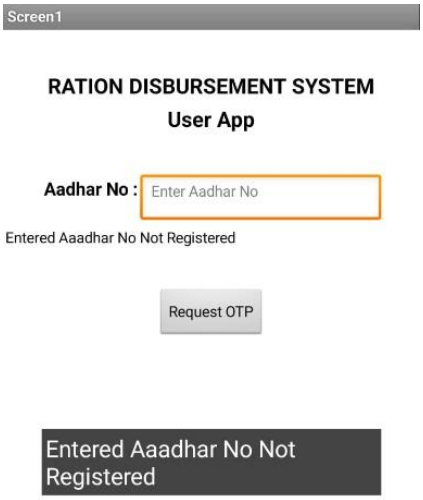


Fig 3.3.8- Invalid Aadhar no.

If a family member tries to register, then the registration is not considered valid and displays “Aadhar number already exists”.

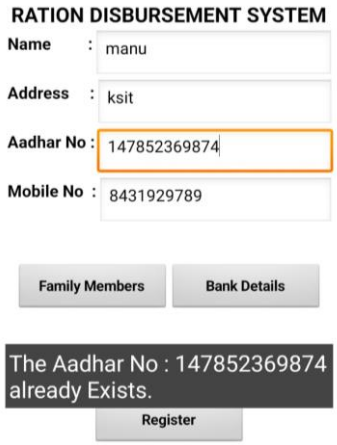


Fig 3.3.9- Existing Aadhar no.

On entering the valid OTP using the keypad, the allotted amount of ration gets dispensed.

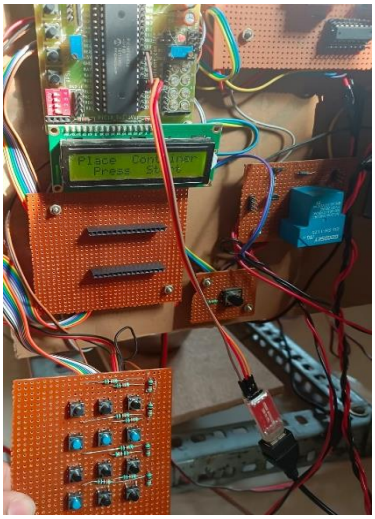


Fig 3.3.10-Display unit

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

ISO 3297:2007 Certified ⁜ Impact Factor 8.066 ⁜ Peer-reviewed / Refereed journal ⁜ Vol. 10, Issue 4, April 2023

DOI: 10.17148/IARJSET.2023.10441

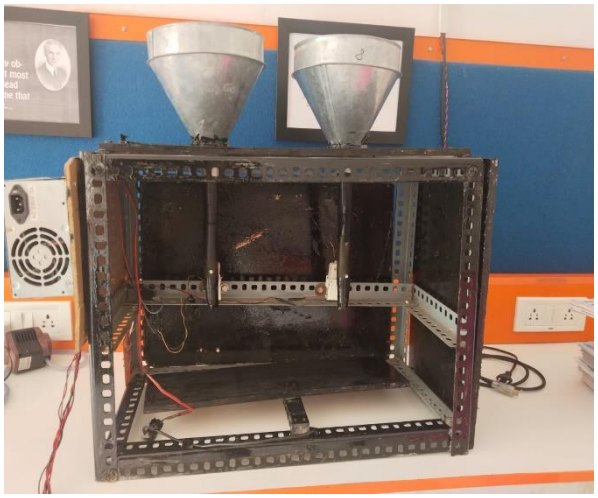


Fig 3.3.11-Dispensing unit

Fig 3.3.12- Horizontal view

V. CONCLUSION

A tamper-proof ration disbursement system for rural areas can help address issues such as corruption, leakage, and inefficiencies in the distribution of essential food supplies. Such a system can ensure that beneficiaries receive their rightful entitlements and improve the overall functioning of the public distribution system. However, careful planning and implementation are necessary to ensure that the system is accessible, user-friendly, and secure for all stakeholders involved. The development and implementation of an Automated Ration Distribution System using advanced digital technologies is a significant step toward achieving the goals of Digital India. So we can conclude that a Tamper-proof ration disbursement system for rural areas can lead to more equitable and sustainable development, promoting the overall well-being of rural communities. The main limitation of our project is the calibration errors there is a calibration error of plus or minus grams for the solids. And for liquids, there are some calibration errors while dispensing. For future enhancement, the proposed system can be further modified by including an automated alert system to refill the grained to the dispensing container by including a level sensor and setting a threshold value. If the threshold is reached, an alert should be given indicating a refill. The system can make use of the database with a government to approve the collaboration so that it can be implemented with integration into the Government database which may provide stock audit at the centric level. The application could be further modified by adding more features such as next month's ration collection date, and request for a change in quantities that are allotted.

DOI: 10.17148/IARJSET.2023.10441

REFERENCES

[1] Nivid Shah, Darshil Jogani, Salina Bavania, Prof. Sunil Nayak "Automation in Government Ration Distribution System using Atmega32 and RFID", International Research Journal of Engineering and Technology (IRJET), Vol. 7, No 4 2020

[2] H C, Sateesh & R, Vinay & P, Sharath & P, Kushal. (2020). "Automatic Ration Dispensing System" IJSART, Vol. 6, No 6, June2020

[3] Golait, Snehal S, Lutika Kolhe, Snehal Rahangdale, Anjali Godghate, Prajakta Sonkusare, and Ashish Sha. "A Review on E-Ration Card System." International Journal of Scientific Research in Computer Science, Engineering and Information Technology, pp 51–53, October 2020

[4] H. A. Umachagi, P. Kulkarni and M. Bilagikar, "Implementation of Automated Water Supply and Distribution using PLC and SCADA," IEEE Bangalore Humanitarian Technology Conference, No.10 pp.5-6, October 2020

[5] Vaishali Vishwakarma, Smriti Saxena, Sunidhi Tripathi, Vaishali Chaurasiya, Dr. Nandita Pradhan, 2022, Three Level Authentication based Automatic Ration Distribution System, International Research Journal of Engineering and Technology (IRJET), Vol. 11, No. 05, May 2022.

[6] Manisha Kurmate, Rasika Bonde, Sneha Parate, Sonali Chimankar, Trupti Khaire "RFID Based Smart Public Distribution System" International Research Journal of Modernization in Engineering Technology and science, vol. 3, No. 3, March 2021

[7] Snehal Jadhav, Sangita Ahire, Manali Aher, Akshay Bhoir, S.S. Vaidya "An efficient, Accurate and Automated Technique of ration distribution using RFID", International Journal of Advanced Research in Science, Engineering and Technology, Vol. 7, No 6, June 2020

[8] Shivakumar Swamy N, Manjunath. R, Shruthi S, Rijin Raj "IoT Based Smart Rationing System" International Journal of Advanced Research in Computer and Communication Engineering (IJARCCE), Vol. 11, No. 5, May 2022

[9] R. Kurinjimalar, R. Arthy, P. Raja "Smart Automatic Ration Card using Webpage", International Journal of Recent Technology and Engineering (IJRTE), Vol-9 No.1, May 2020

[10] R. S. Krishnan, A. Sangeetha, A. Kumar, K. L. Narayanan, and Y. H. Robinson, "IoT-based Smart Rationing System," 2021 Third International Conference on Intelligent Communication Technologies and Virtual Mobile Networks (ICICV),2021, pp.300-305, May 2021

[11] Sunitha R, Kavya B, Leha M, Nisarga R, Nalini N, 2021, Aadhaar Enabled Automated Ration Distribution System for Remote Places using Arduino, International Journal Of Engineering Research & Technology (IJERT) NCCDS, Vol. 09, No. 12, March 2021

[12] Sathya. M. P, Jayachithra.S, Muthu Kumara Pandian. An "Automatic Ration Distribution System Using IoT with Anti-theft and Anti-spill alarm", International Journal of Engineering Research and Applications, Vol. 10, No. 5 , pp. 55-59, May 2020

[13] Adil, Mohd Idrees, Kshitija Butle, Preeti Dhoke, Diksha Tandekar, D and Syed Razeem Azimuddin."E-RATION DISTRIBUTION.", International Research Journal of Modernization in Engineering Technology and Science, Vol. 3, No. 05, May 2021

[14] R. S. Krishnan, A. Sangeetha, A. Kumar, K. L. Narayanan, and Y. H. Robinson, "IoT-based Smart Rationing System," 2021 Third International Conference on Intelligent Communication Technologies and Virtual Mobile Networks (ICICV), 2021, pp. 300-305, October 2021

[15] Shivaanivarsha N, Vigita S, Santhini V "Design Of Iot Based Smart Ration Dispensing System Using Loadcell Feedback To Prevent Ration Fraudulence" International Journal of Creative Research Thoughts (IJCRT), Vol. 9, No. 6 June 2021

[16] Sahil Laxman Podey, Sourabh Hemant Naik, and Prof. D. N. Duche, "IOT BASED RATION DISTRIBUTION SYSTEM", IEJRD - International Multidisciplinary Journal, Vol. 6, No. ICMRD21, p.6, April 2021.

[17] S. Valarmathy, & Ramani, Raagav & Akhtar, Fahim & Selvaraju, Sriram & G. Ramachandran, (2013). "Automatic Ration Material Distributions Based on GSM and RFID Technology". International Journal of Intelligent Systems and Applications, Nov 2013

[18] Shrikrishna Huilgol, Sivapuram Ramarohith, Shrinidhi Hegde, Priyanka Shisanalli, Prof. Varsha Jadhav "Automatic Ration Vending Machine using RFID and GSM Technology", International Research Journal of Engineering and Technology (IRJET) Vol. 9, No. 6, June 2022.

[19] Gaikwad, Ajinkya, Sonam Sachdev, Simran Khushalani, and Kishor Wane. "secure contactless automatic ration distribution system using internet of things." Journal of Huazhong University of Science and Technology ISSN 1671: 4512.

[20] Jadhav, S. D., Amruta Dhavade, Pratiksha Jaybhaye, Manali Karpe, and Anuja Pawar. "Smart Technology for Automatic ration distribution of Commodities." International Research Journal of Innovations in Engineering and Technology 5, No. 4, March 2021.