



Iot Based Automation in Public Distribution System

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ABSTRACT

Subsidizing vital household commodities for poor families is a critical component of satisfying people's basic needs in developing countries like India. Manual amount measuring and transaction record keeping are required by the current public distribution process in Ration outlets. Any issues are dealt with by the current system. A smart public distribution system based on the Internet of Things provides an automated means of distributing things to authorised card users to address these difficulties. In addition, all transaction information are stored in a database. Users must use their Smartphone's to check in to their accounts and provide their ID and password. Once they've successfully logged in, they can check the stock availability. The Minutiae extraction-based fingerprint matching approach is used to identify individual cardholders.

Key words: IoT, distribution system, smart phone, fingerprint

INTRODUCTION

Economically disadvantaged people receive subsidised food, oil, and fuel from the government, which is supplied to the general public through ration shops. Farmers will provide the stock for these ration shops, which will then be sold at subsidised prices. Every month, new goods arrive at these stores, which must be dispersed to the general audience. Most ration shop owners engage in unethical behaviour, and the prescribed amount of ration is not supplied to authorised individuals. To combat these fraudulent actions, a system has been created that includes the following aspects.

1. The system's security is ensured by using a fingerprint authentication technique to identify a specific user.
2. To select the commodity and its quantity, an Android application must be utilised.
3. Ration amount information that has been pre-programmed
4. Automatic rations distributing mechanism.

The country's food security the central government purchases and distributes special needed commodities at fixed central issue prices under the public distribution system (PDS). Previously, the PDS provided a variety of products such as iodized salt, palm oil, candles, ghee, fabric, and so on. However, the current Department of Food and Supplies has limited the fair price distribution to a few grains, wheat, rice, sugar, and kerosene oil. In India, there are currently 4, 78,000 ration stores located around the country. Various villages, towns, and cities, making it the world's largest distribution network. The Department of Food and Supplies issues ration cards to citizens based on their financial circumstances. There are mainly two types of cards:

Below poverty line (BPL) cards

Above poverty line (APL) cards

Many fraudulent operations are taking place on unfair price stores in violation of the essential commodities act. Users are forced to stand in huge lines for hours in order to obtain basic necessities. In a notebook, cardholders and their family members' information is kept. As a result, each time the cardholder completed a transaction, the book had to be manually entered. Maintenance of record in book is difficult. An effective and automated technique is required to reduce misappropriations. The amount of rations to be given out for these cards is determined by the number of family members in the card holder's household [6]. The Essential Goods Act of 1955, which regulates commerce in selected essential commodities by keeping a strict eye on inventories, passage, quality, and availability of these commodities, is enforced by the Department of Food and Supplies. The collecting of information and proof of violations of the applicable control orders, as well as action taken against them under the requirements of the Essential Commodities Act, constitutes enforcement.

A. Objective and motivation of the project

An effective and automated technique is required to reduce misappropriations. The number of family members in the cardholder's home determines the amount of rations that will be distributed. The Department of Food and Supplies enforces the Necessary Goods Act of 1955, which regulates trade in certain essential commodities by keeping a close check on inventories, movement, quality, and availability [3]. Enforcement is defined as the gathering of information and verification of violations of applicable control orders, as well as taking action against them in accordance with the Essential Commodities Act's requirements cards, and to make manual data entry less time-consuming. The techniques used to protect fair-priced shop products in black market places.

B. Scope of the Project

Modernizing the FPS can be aided by computerization. The goal of this project is to create a more efficient and effective ration card system using the SMART CARD. Users, shopkeepers, and the government will all benefit from the proposed arrangement. Shopkeepers have this Android app and one IoT device, so it's simple to operate and saves money. Beneficiaries can check their ration data by entering their ration id on the website. Notification contains the confirmation message of commodity lifted by customer. When rations come, according to area category software will distribute the dates and send notification to group according to date. Beneficiary can see stock availability and can do complaint about material or any issue. Automation of the distribution system at the ration shop, as well as database maintenance and updating at a single primary control station, so that the shopkeeper does not defraud the poor [7].

EXISTING SYSTEM

At the current system, once a recipient realises that our monthly ration is available in a store, they go to the store with their traditional ration card, which must be renewed every 1-2 years. Beneficiary accepts the card and joins the queue. When his/her time comes, he/she gives his/her ration card to the shopkeeper, who has an E-PoS (Electronic Point-of-Sale) machine, enters the information on it, and then gives the beneficiary the appropriate commodity based on the card type. The shopkeeper also makes a note in his register. After that, the shopkeeper takes the beneficiary's signature and issues a receipt. After that, payment is made. Beneficiaries are unaware of available supply in the current system [3].



Drawbacks of Existing System

A. Stock Availability

There is a significant difficulty with the current method in that we are unable to verify live stock at ration shops to determine whether the food is available [2]. For this reason, we propose to establish a system in which, as PDS sends stock to shopkeepers, our system updates the food stock quantity, allowing customers to check whether stock is present or not at the shop via the customer app.

B. Publish Rush & they will not maintain the SocialDistancing

At every first week of month there will be huge rush of peoples in front of ration shop and they will not maintain any social distancing and it cause to spread the corona virus for overcoming this problem statement we are going to build an our own algorithm for this purpose which is responsible to perform following things. This algorithm sends sms and app notification to the customer It will send sms and notification to only 50 customers for per day and also allocate the time slot to take the food So with this approach we can maintain the social distancing [5].

C. Existing Finger Biometric Authentication Device

Current in PDS system they used a Finger Biometric Authentication Device to get and validate the customer ration stock and family details in this system something device got failed to get the customer finger print because of contiguously using of system and in this system shopkeeper has to physically touch the customer finger which responsible spread the covid type viruses. And this Biometric Authentication Device is too slow and very time consuming. To overcome this exiting problem we replace this system with the QR Code so that shopkeeper don't have to touch the customer finger and this QR code system have higher speed of execution for authentication the customer as compare to the biometric device. Each customer has their own QR code which consist the ration id [6].

Each time whenever customer visit to shop for buying food that time they has to show their QR code to shopkeeper then shopkeeper will scan that QR code and once it get scanned successfully the shopkeeper will get immediate details of customer family and food stock.

LITERATURE SURVEY**In [1] Smart Ration Card**

This paper proposes the improvised technique of implementing smart ration card. The main objectives of smart ration card are providing food grains and other essential items to vulnerable sections of the society at reasonable (subsidized) prices and to eradicate inefficiency in the targeting of beneficiaries and the resulting leakage of subsidies which is the main disadvantage of the present PDS (Public Distribution System). These objectives can be achieved by creating a unique database of residents in India and will put together the best technologies and processes for this purpose. This will lead to a database without duplicate entries and ghost cards which will help to avoid illegal and bogus claims and fraud in distribution of ration.

In [2] Web Enabled Ration Distribution and Corruption Controlling System

The aim of this paper is to organize and summarize existing theoretical and empirical work on corruption with a view identifying opportunities for further research. Computerization can help in modernizing the PDS. The southern states as usual have led the way on many reforms intended to address the issues above, and increasingly even poorer states have introduced changes in policies and implementation mechanisms to address the problems of PDS. This paper discusses strategy adapted in using ICT to control diversion and leakage in the delivery mechanism and its successful application in computerization of food grain supply chain. As an outcome of the project, 0.78 Million farmers have received computer generated cheques without any delay. Citizen involvement in the system has been increased in monitoring PDS. Here efforts from our side are done to overcome one of the corruption problem involve in ration distribution system through a kind of electrodynamic web template where distribution of ration products like kerosene, rice, wheat etc. at rural and urban areas, will be checked, monitored and controlled with filtering the problem of corruption and adulteration.

In [4] Web-Enabled Ration Distribution and Controlling These system efforts to overcome one of the corruption problems involve in ration distribution system through a kind of electrodynamic web template where distribution of kerosene, rice, wheat etc. at rural and urban areas, will be checked, monitored and controlled with filtering the problem of corruption. The website will help us to remotely monitor the kerosene outlet and the vehicles providing the kerosene and ration material till it reaches the storage areas and also the distribution at local people will be done centralize through a web application which will keep record of user id and password for every people with solenoid valve, Hoop valve to control openings of ration outlet etc... this will assure us no involvement of any person directly with distribution system, also whether kerosene disposition is also sensed at web site using proximity sensor through web giving a clear idea about delivery of it.

In [5] A case of supply chain management of Public Distribution System operations in the Chhattisgarh state of India Globally New Public Management is concerned with improving public service delivery. Changes in service delivery occur either due to demands from the society or state vision. Different maturity models also take similar view on e-governance adaptation. The technological sophistication of a society is critical to social, political and economic growth

of a society. Further, changes in social, political and economic spheres and technology happen in definite stages. State vision, however, needs to be guided by concerns of improving capabilities of the citizens rather than growth alone. ICT implementations would be a success when their design, aspirations of the society and the concerns of the government are in harmony. When technology is driven by strategic vision alone, the design of technology may not be reflecting the possibilities that can be achieved with the technological capabilities and the governance processes may not be optimized to empower citizens.

In [6] e-Ration Shop: An Automation Tool for Fair Price Shop under the Public Distribution System in the State of Andhra This paper discusses strategy adapted in using ICT to control diversion and leakage in the delivery mechanism and its successful application in computerization of food grain supply chain. The objective of the paper is to enhance the visibility, accessibility, and efficiency of the system by properly designing a software-system, which will streamline the process of PDS/ FPS.

AIM AND OBJECTIVE

- **Aim:** Our aim is to provide an interface where user data confidentiality as well as security in the cloud and to provide a secure and smart way of distribution of ration.
- **Objective:** In order to track the inventory and confirm the number and size of the food. There will be another Android app (End User) for customers where they can simply check the food stock available at the store [6]. We are introducing the e-Ration System in order to make it more efficient and improve the present PDS system. In this project, we'll use an IoT device and an Android app for customers and shopkeepers, as well as a web-based PDS system. There will be a Web Portal (Admin) where the PDS department will update the stock on the web portal whenever they deliver the food item stock to the shopkeeper so that we can simply follow the supply quantity of food and remove the guess workstation shop or and also able to check the price of food and available quantity of food at ration shop and with this app customer will be able to see its previously buy food transaction details and family details and they will also have one QR code in this app. The IOT device is responsible for scanning the customer.

PROPOSED SYSTEM

First and foremost, in the planned work, we will make use of E-government technology, which is being applied in nearly every aspect of government administration. The E-Rationing system would be used to combat corruption and degrade the quality of commodities. The user would register online using their personal credentials and information. In addition, when registering, family information must be provided. As a result, anytime a person receives news that goods or services have been delivered, he must go through the verification process to demonstrate that he is the authorized person. He can collect the quantity logged into the system once verification is performed successfully [4].

It will be possible to create a module that is unique to each customer using QR codes. Likewise, we are going to develop complaint portal where user can register the complaint against the Distributor if he is providing bad quality food.

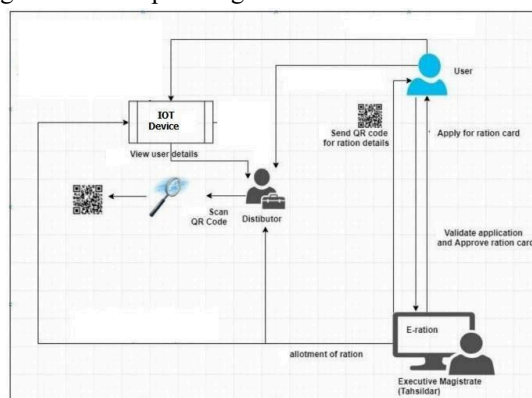


Fig. 1 System Architecture

A. QR Code

This method introduces the concept of QR images, which is an automatic approach for inserting QR Codes into colour photos with a low risk of detection error. These embeddings are compatible with conventional decoding software and can be used to cover the whole region of any colour image. The luminance values of the image are encoded using QR information bits, which take advantage of QR scanners' tolerance for local brightness variations. To lessen the optical

distortion of the QR picture, the Haloing masks are used to select modified pixels, and nonlinear programming techniques are used to optimize brightness levels locally.

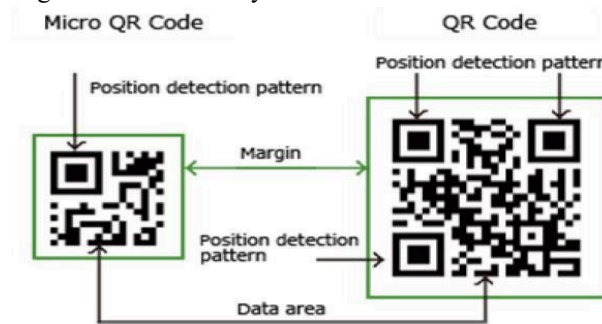


Fig. 2 QR Code System

A tractable model for the likelihood of error, as well as models of the human visual system, is used in the quality metric used to optimize the luminance levels of the QR image. The optimization algorithms given are aimed to be scalable to parallel implementations in order to reduce processing time and take into account the mechanics of a common linearization method. The experimental results show that the decoding rate and perceived quality deteriorates smoothly as the embedding parameters change. A graphic comparison of the proposed and existing methodologies is provided.

B. ESP32-CAM

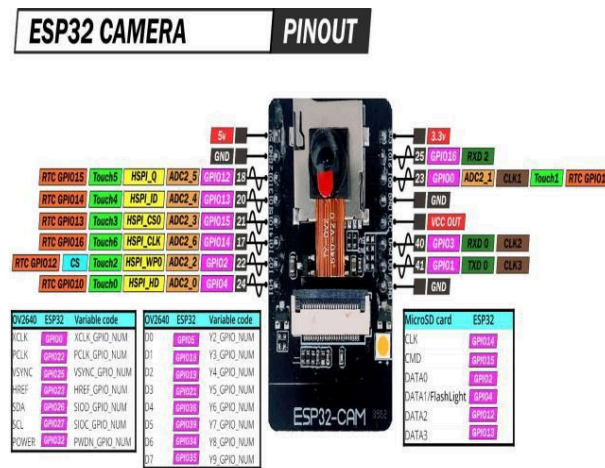


Fig. 3 ESP32 Camera Pin out

Based on the ESP32 microcontroller, the ESP32-CAM is a small, low-power camera module. It comes with an OV2640 camera and a TF card slot. The ESP32-CAM can be used for wireless video surveillance, Wi-Fi picture upload, QR identification, and other intelligent IoT applications.

Features

- Onboard ESP32-S module, supports Wi-Fi + Bluetooth
- OV2640 camera with flash
- Onboard TF card slot for data storage that supports upto a 4GB TF card
- Supports Wi-Fi video monitoring and Wi-Fi imageupload

C. ESP8266 Wi-Fi Module

It's a self-contained SOC with an integrated TCP/IP protocolstack that can connect any microcontroller to your Wi-Fi network. The ESP8266 may either host an application or offload full Wi-Fi networking capabilities to another processor. Each ESP8266 module is pre-programmed with AT command set software, allowing you to connect it to your Arduino device and get about as much Wi-Fi capabilities (straight out of the box) as a Wi-Fi Shield! The ESP8266 module is a low-cost board with a sizable and growing community.

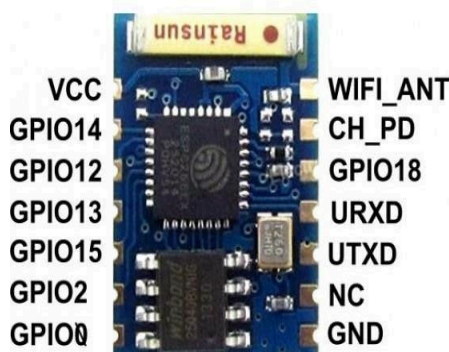


Fig. 4 ESP8266 Wi-Fi Module

This module has enough on-board processing and storage to interact with sensors and other application-specific devices via its GPIOs with minimum development and load during runtime. The front-end module is meant to take up as little PCB space as possible, thanks to its high on-chip integration. The ESP8266 supports APSD for VoIP applications and Bluetooth co-existence interfaces, has a self-calibrated RF for use in any environment, and does not require any additional RF parts [2].

CONCLUSION

Smart public distribution system based on IoT is an automated system that compensates for the current fair price retailers. Fingerprint authentication is based on Minutiae extraction, which makes the system more secure and accurate. It eliminates false ration card holders and safeguards the interests of the general public, maintaining food security in the country. Its performance can help to lower the level of corruption. The system will be more intelligent and resilient if the commodity and quantity is selected using the Android app.

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