e–Ration Shop : An Automation Tool for Fair Price Shop under the Public Distribution System in the State of Andhra Pradesh

Mahammad Shafi. Ph.d
Professor and HOD,
Department of Computer Science and Applications,
Sree Vidyanikethan Engineering College
A.Rangampet, Andhra Pradesh

K.Munidhanalakshmi
Assistant Professor,
Department of Computer Science and Applications,
Sree Vidyanikethan Engineering College
A.Rangampet, Andhra Pradesh

ABSTRACT
The Government of India in an effort to ensure fair supply of food items to all citizens of India instituted Fair Price Shops (FPS) under Public Distribution System (PDS). Essential commodities such as Rice, Wheat, Sugar, Kerosene, etc., are supplied to the targeted underprivileged sections as per the eligibility and at fixed by the Government of India. In spite of the best efforts by Government officials at various levels, there are a few bottle-necks and inconveniences to the targeted citizens in availing the services provided. 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/ FPS. The Andhra Pradesh State has 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/ FPS[1]. 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.

Keywords
Biometrics, finger print, identification, Database, Server

1. INTRODUCTION
Public Distribution System (PDS) is an Indian food security system. It is established by the Government of India under Ministry of Consumer Affairs, Food, and Public Distribution and managed jointly with state governments in India. The traditional PDS is used to distribute grocery items to India's poor who are valid ration card holders. The validity and the allocation of the ration cards is monitored by the state governments. A ration card holder should be given 35 kg of food grain as per the norms of PDS. However, there are concerns about the efficiency of the distribution process. In order to make it efficient and improve the current system of PDS we are implementing e-Ration Shop with Biometric device. Here we are going to use a Biometric device for shopping purpose. Using this device card holder can get his/her grocery items from the FPS. The main reason for using this Biometric device and making this process computerized is to remove the drawbacks of the present way of issuing products based on ration card. The main drawback in the current system is that the PDS has been criticized for its urban bias and its failure to serve the poorer sections of the population effectively. The targeted PDS is costly and gives rise to much corruption in the process of extricating the poor from those who are less needy. Also many retail shopkeepers have large number of bogus cards to sell food grains in the open market.

Many FPS dealers resort to malpractice since they acquire less salary. Most of the times Users do not get their rightful entitlement in terms of quantity. What's meant for them or the farm produce procured by the FPS's is diverted to the open market. So in order to avoid all these drawbacks we are going to use the e-Ration Shop with Biometric device which will help us to avoid the corruption in PDS if not eradicate it.

2. LITERATURE SURVEY
The Public Distribution System (PDS) in the country facilitates the supply of food grains to the poor at a subsidized price. However, doubts have been raised about the efficacy and cost-effectiveness of the PDS, especially in the light of the growing food subsidy and food stocks. The PDS needs to be restructured and there is a need to explore the possibility of introducing innovative ideas such as smart cards, food credit/debit cards, food stamps and decentralized procurement, to eliminate hunger and make food available to the poor wherever they may be in cost-effective manner. To prevent corruption and foster the development of small and medium-sized enterprises, the United Nations Industrial Development Organization (UNIDO) and the United Nations Office on Drugs and Crime (UNODC) have joined forces to carry out this study, which looks at the nature and extent of the problem. This report is based on field-based assessments and a meeting of experts that discussed obstacles for SME development created by public and private sector 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, Hooper valve to control openings of ration outlet etc. This will gives 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. And also all data is stored at time about ration items and the people who receives the ration from that place.

3. PROPOSED SYSTEM

e-Ration Shop with Biometric device is to give information related to card holders and to record all transactions. In this system, a fingerprint [3] scanner is proposed to be used as the biometric device. Since the finger print of the citizens are already in the database of Aadhar Card, a positive match can be ensured each time the consumer visits the FPS. The following are a few tasks that are considered for implementation as a part of the proposed project to address lacunae in present manual PDS/ FPS [2].
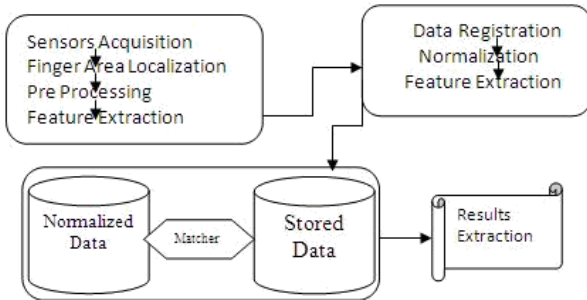

Figure 1: Processing of Proposed System

- **Difficulty for eligible and excluded beneficiaries to obtain new ration cards.**
  Establishing the identity and uniqueness of new applicant involves a thorough check to verify the genuineness. The task will be simplified to a great extent by cross-matching the applicant details with already existing entries from database such as Aadhar Card database, Voters List database, etc., The e-Ration Shop with Biometric device enables such searches and cross-verifications.

- **Difficulty in updating details such as addition/ deletion of member(s), change of address, change of FPS, etc.**
  Updating details such as changes in family change in residential address, marriage in family and birth or death occurring in a family needs to be properly recorded for effective inventory control and distribution of rationed essential commodities. e-Ration Shop with Biometric device is a software system to automatically update and "flag" such changes so that the FPS manager can initiate proper action.

- **FPS does not open every day, nor do they keep regular hours. Even on the days that the FPS is open, ration card holders have to stand in long queues.**
  Generally FPS neither opens every day nor do they keep regular hours. The proposed software system provides information about the day and time to report at e-Ration Shop to the card holders through SMS. The schedule mechanism in e-Ration Shop divides the total number of card holders based on categories and sends a message accordingly. This makes the card holders not to stand in queue for long duration of time.

- **FPS Manager has to maintain registers manually and has to spend considerable time to submit reports to the Food Department.**
  Considerable time is spent by the FPS Manager to document various details such as list of customers, list of items purchased by the customer, inventory on hand, projected inventory for next purchase date,

and several other periodic, cumulative reports. Such reports can be automatically generated using the e-Ration Shop with Biometric device system, thus saving a lot of time and avoiding manual errors.

- **No mechanism to identify inclusion errors such as duplicate, bogus and ineligible beneficiaries.**
  The fingerprint [3] is a unique human characteristic and hence this is used in the FPS to make it foolproof. Hence duplicate, bogus and ineligible beneficiaries can be avoided.

On the whole, e-Ration Shop with Biometric device system aims to ensure that only the entitled lot receives the subsidized food material and all other routine chores of inventory planning and reporting are done with least human intervention to ensure smooth operation of the PDS scheme.

4. DATABASE MAINTENANCE

e-Ration Shop with Biometric device will have two databases for two different categories i.e. one for the card holder information and the other one to store the details of the products that are being distributed to the people below poverty line. So every time the distribution has been made there is a necessity of updating and maintaining the database to avoid the miscalculations.

Figure2: Registration of Information

Customer's Database:
For maintaining this database we have to collect all the related information and have to store it in the database. Every time if there is any change in the details provided by the customer. It should be immediately updated in the respective database. When the distribution of the products is made then the credits will be deducted from the customer's account so the dealer should make sure that it is updated in the following database and the credits are deducted from his/her account.

Product's Database:
This database is used to contain the details of the products available at the FPS. When the stock of products arrives at the FPS then that particular amount of data is updated in the database. When the distribution is made to the people below the poverty line then the quantity of the products reduces in that particular FPS and hence it should be updated in the database. For example if 3kg of rice has been distributed to particular customer then that 3kg should be deducted from the total amount(quantity) of rice in the database. Maintaing the

database and generating the bill becomes important because these are the two factors that will help the government to avoid the corruption in PDS.

5. FINGERPRINT BIOMETRIC DEVICE

Fingerprint recognition is the technology that verifies the identity of a person based on the fact that everyone has unique fingerprints. It is one of the most heavily used and actively studied biometric technologies [3].

1. Why Fingerprints?

The cost of a fingerprint based biometric system is quite low in comparison to others like iris and face readers. Fingerprint based systems are quite strong and can be deployed across any kind of environment. This system is less intrusive than iris or retina scans. Most people find it unacceptable to have their pictures taken by video cameras or to speak into a microphone. Finger based systems are more user friendly. Besides, the ability to enroll multiple fingers makes this a very flexible option. It is a proven technology and has been in use for a long time as compared to other nascent technologies.

2. Principles of fingerprint biometrics

A fingerprint is made of a number of ridges and valleys on the surface of the finger. Ridges are the upper skin layer segments of the finger and valleys are the lower segments. The ridges form so-called minutia points, ridge endings and ridge bifurcations. Many types of minutiae exist, including dots, islands, ponds or lakes, spurs, bridges. The uniqueness of a fingerprint can be determined by the pattern of ridges and furrows as well as the minutiae points. There are five basic fingerprint patterns: arch, tented arch, left loop, right loop and whorl. Loops make up 60% of all fingerprints, whorls account for 30%, and arches for 10%.Fingerprints are usually considered to be unique, with no two fingers having the exact same dermal ridge characteristics[4].

3. How does fingerprint biometrics work?

The main technologies used to capture the fingerprint image with sufficient detail are optical, silicon, and ultrasound. There are two main algorithm families to recognize fingerprints:

1) Patterns: The three basic patterns of fingerprint ridges are the arch, loop, and whorl. An arch is a pattern where the ridges enter from one side of the finger, rise in the centre forming an arc, and then exit the other side of the finger. The loop is a pattern where the ridges enter from one side of a finger, form a curve, and tend to exit from the same side they enter. In the whorl pattern, ridges form circularly around a central point on the finger. Scientists have found that family members often share the same general fingerprint patterns, leading to the belief that these patterns are inherited. Pattern matching compares the overall characteristics of the fingerprints, not only individual points. Fingerprint characteristics can include sub-areas of certain interest including ridge thickness, curvature, or density. During enrollment, small sections of the fingerprint and their relative distances are extracted from the fingerprint. Areas of interest are the area around a minutia point, areas with low curvature radius, and areas with unusual combinations of ridges.

2) Minutia features: The major Minutia features of fingerprint ridges are: ridge ending, bifurcation, and short ridge (or dot). The ridge ending is the point at which a ridge terminates. Bifurcations are points at which a single ridge splits into two ridges. Short ridges are ridges which are significantly shorter than the average ridge length on the fingerprint. Minutiae and patterns are very important in the analysis of fingerprints since no two fingers have been shown to be identical. Minutia matching compares specific details within the fingerprint ridges. At registration, the minutia points are located, together with their relative positions to each other and their directions. At the matching stage, the fingerprint image is processed to extract its minutia points, which are then compared with the registered template.

4. Issues with fingerprint systems

The tip of the finger is a small area from which to take measurements, and ridge patterns can be affected by cuts, dirt, or even wear and tear. Acquiring high-quality images of distinctive fingerprint ridges and minutiae is complicated task. People with no or few minutia points cannot enroll or use the system. The number of minutia points can be a limiting factor for security of the algorithm. Results can also be confused by false minutia points. There is some controversy over the uniqueness of fingerprints. The quality of partial prints is however the limiting factor. As the number of defining points of the fingerprint becomes smaller, the degree of certainty of identity declines. There have been a few well-documented cases of people being wrongly accused on the basis of partial fingerprints [4].

5. Benefits of fingerprint biometric systems
1. Cheap
2. Small size
3. Low power
4. Non-intrusive
5. Easy to use
6. Large database already available

6. Disadvantages fingerprint biometric systems
1. Vulnerable to noise and distortion brought on by dirt and twists.
2. Some people have damaged or eliminated fingerprints.
3. Using fake fingers by intruders.

7. Applications of fingerprint biometrics

Fingerprint sensors are best for devices such as cell phones, USB flash drives, notebook computers and other applications where price, size, cost and low power are key requirements. Fingerprint biometric systems are also used for law enforcement, Forensics, dermatoglyphics, background searches to screen job applicants, healthcare and welfare [5].

6. CONCLUSION

This paper portrays the Automation of the Public Distribution System (PDS) and its recompense over the present Fair Price Shops. By means of this performance we can reduce the corruption level. It will help the country's economy to reach new heights. The automated[1] PDS is easy to implement and requires much less hard work when compared to the other system using of this system we can avoid the malfunctions because there is no manual operations .Now in a new system all information is stored in database. So implementing this will be really helpful to the people below poverty line.

7. REFERENCES

[1] Automated attendance system using Biometrics with Embedded web server, Graduate Research in Engineering and Technology (GRET): An International Journal.

[2] Caesar, A.; Khan, S.A., Automation of Time and Attendance uses RFID Systems, IEEE-ICET 2006 2nd International Conference on Emerging Technologies, Peshawar.

[3] Josphineleela. R and Dr. M. Ramakrishnan, An Efficient Automatic Attendance System Using The Fingerprint Reconstruction Technique, International Journal of Computer Science and Information Security, Vol. 10, No. 3, March 2012

[4] Smart Ration Card, Volume 4, No. 4, April 2013, Journal of Global Research in Computer Science, ISSN-2229-371X

[5] Web Enabled Ration Distribution and Corruption Controlling System, International Journal of Engineering and Innovative Technology (IJEIT) Volume 2, Issue 8, February 2013.

8. AUTHOR'S PROFILES

Dr.Mahammad Shafi obtained Bachelor's degree in Sciences from Sri Venkateswara University, Tirupati. Then he obtained his Master's degree in Computer Applications from University of Madras, Chennai.. Then he obtained his Ph.D from University of Allahabad, Allahabad. He is working as Professor and Head of the Department in the Department of Master of Computer Applications at Sree Vidyanikethan Engineering College, A. Rangampet, Tirupati. He is in teaching since 1998. He presented many papers at National and Internal Conferences and published articles in National & International journals.

Ms. K.Munidhanalakshmi is working as Assistant Professor of Master of Computer Applications of Sree Vidyanikethan Engineering College,A. Rangampet, Tirupati, India. She is having more than 6 years of teaching experience and 1 years of research experience. Her areas of interests include Software Testing, Cloud Computing, Databases, etc., She has published several national and international papers in conferences and journals.