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Smart Ration Card System, an Android Application using Data Mining

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***Abstract*— Ration card plays a vital role for every household to get subsidized food grains, gas connection, etc. In this paper, we have proposed a smart ration card system using an android application with virtual ration coins to prevent the malpractices and corruption in the current system. And also nullify the fake ration cards in the country by using database authentication. The conventional ration card will be replaced by an Android application and will be used by the user to search near by Ration Shops, check their products availability, prices and also pay the Ration Coins via QR scanner. Verification of user will be done using One Time Password (OTP) to registered number for Payment . After successful transaction the database will be updated stating the ration content delivered to the user. This system requires less human efforts for operation and is also very secure.So by implementing this system government can keep a track and note all the distribution of the ration in the country.**

***Keywords*— *Ration Card System; Android Application; Data Mining Techniques; Firebase*.**

I. INTRODUCTION

Ration card is a very important document for everyone and it is used for many purposes such as family members details, to get gas connection, it acts as address proof for various purposes like issuing passport, pan card to buy the grocery (sugar, rice, oil, wheat, kerosene, etc) from the ration shops. But this system has two draw backs, first one is there can be ration forgery and second one is it is very time consuming.[5]

The distribution of ration is directly controlled and monitored by both the central government and the state government authorities. The central government takes the responsibility of storing, distributing and transportation, allocation of food grains, state government holds the responsibility for distributing the same to the consumers through the established network of FPSs. The process of allocating and identifying families below poverty line, issuing ration cards, supervising and monitoring the functioning of FPSs is done by State Governments. Under PDS scheme, each family below the poverty line is eligible for 35 kg of rice or wheat every month, while household above poverty line is entitled to 15kg of food grains on monthly basis.[5]

There are three ration card categories based on the economic status of family. The ration card (book) has to be updated physically/manually and also to be renewed as it gets over. For purchasing item the customer is verified using fingerprints. The manual process of updating book is tedious and fraudulent.

The retailers practice forgery by not selling the required quantity of goods to the people. On the other hand customers do not get the deserved quantity of grocery.

The manual Ration Card being used is shown in the below picture.

The Government spends lots of money to subsidize the food grains for the Common People but the middle man/ distributors gets all the benefits by doing corruption and forgery. [6]

Ration shopkeepers also have fake ration cards with them to benefit themselves. Due to availability of all ration items these items are present with the ration shop dealer so he can falsify the records and use the items to sell in the market loosely. The dealer then does not provide these ration items to the customers. Many a times people are not aware that the items have arrived in the shop. The dealer then sells these items in increased rates in the market. In this way, in the current situation we are facing problem due to lack in transparency. There is no such good system yet developed through which government gets message of usage of grains by the people. [8]

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1.1 PURPOSE:

The current Ration Allocation System is an offline/ manual one. Due to this, corruption is seen alot. Dealers give false records to benefit themselves. They also provide the ration items of the poor people at maximum rates which is not justified. There is a no common ground between the dealer and consumer. Due to this issue the poor people do not get the items as stated on their ration card and they don't receive their portion well. And there is no such complaint system developed yet through which the consumers interests can be protected and . Using the Smart Ration Card System, we wish to do away with all these problems and create a system which would be fair and just for all.[10]

II.LITERATURE SURVEY

In order to overcome inefficient traditional way of ration distribution and its management, we developed an efficient smart system to maintain Ration card and make it digital way. To maintain manual database of ration card of every individual in traditional way is very difficult and time consuming process. Biometric authentication is being used nowadays but also has its own drawbacks. All those having their advantages and disadvantages, Smart ration card system is the best replacement to bulky, time consuming manually or digitally management of Distribution of ration. This system is for monitoring ration distribution in smart way and performs various activities for security purposes along with gathering important data for the government to take action on .[1][3][5]

The current system has only manual data entry in the ration card book and the database management is very difficult, authentication is done using biometric but it has its flaws too. The ration is given using faulty measures[3]. Fake ration cards are used by the distributors to gain profits of the system and sell the grains in black market[4]. Corruption is done at the distributor end and thus it's a huge loss for the nation's economy. According to all the research of the current system the above are the problems faced by the nation and the common man.[8][4]

III. PROPOSED SYSTEM

Our proposed idea promotes Credit Based System to pay. Credit System consists of the amount that the government spends on Ration Card Holders Annually. Government will transfer Ration coins (virtual coins) in the card holders account in the app at the start of the year according to their Card type. Users can use this ration coins to buy products from the different Ration Distributers giving them freedom to buy from any vendor. There will be Three Profiles in Application ie- User, Distributor, Admin. The Application will be helpful to look for Items at the Ration shop and even pay Ration Coins via using Barcode Scanner and proper Authentication will be done to pay for the Items. All public distribution system methods will convert into digital system, so effective control on all distributors and fake ration cards will be detected easily which will help to save country's Rs 17000 Crores and increase the Nation's Economy. Ratings feature will be deployed as to rate the service given by the distributor and everything willl be saved in database.

Virtual Coins is that money which Government spends on an individuals ration for a Year. The coins will be put in Users account at start of year. Virtual Coins to be credited will be calculated by the below formula-

Virtual Coins = Ratio of No. of Family Members + The Economic Status of the Family + C+D.

C and D are Constants depending on Government Budget.

All this Data will be stored in Central Database so no faulty measures or false data will be shown by the distributor saving governments lots of money and even fight corruption. Many areas will be sorted using these data and Government can take proper actions to solve all the difficulties faced by the common man regarding the Ration distribution in the country.

So our aim is to provide evolutionary digital platform for public distribution system and support Digital India

3.1 WORKING:

The data such as Ration card number, Aadhar number, phone number and address etc, will be saved and object id for the user will be created using Firebase Realtime Database. The database will have all the information of the users last transaction history ,balance ration coins, history of ration shops visited. The items and ration shops preferred data will be very helpful for the government and all this data will be mined using BigQuery techniques on firebase Database and then again adding all the mined information to firebase so as to deliver the analytic data to the client.

The data of various cities and their locations/parts will be mined to get a good overview of the ration distribution over the city and complete knowledge will be acquired regarding the management of the system going on in the city. Clusters will be formed showing all the ration shops in the country/city and different categories will be created to identify the sorting of distribution shops over the city. Blacklisted and fraud ration shops will be also noticed and government can take proper action on that.

K means and Apriori Algorithms will be used to find the clusters and classification of the ration shops in the city and also the frequently buyed products/items will be displayed. Authentication will be done for the user and then he will pay the ration coins to the distributor. The algorithms will also help to figure out the low rated ration shops and then take proper action on them. To solve the fake ration card problem the authentication using the Fire base real time authentication for ration card number and registered phone number will be done.

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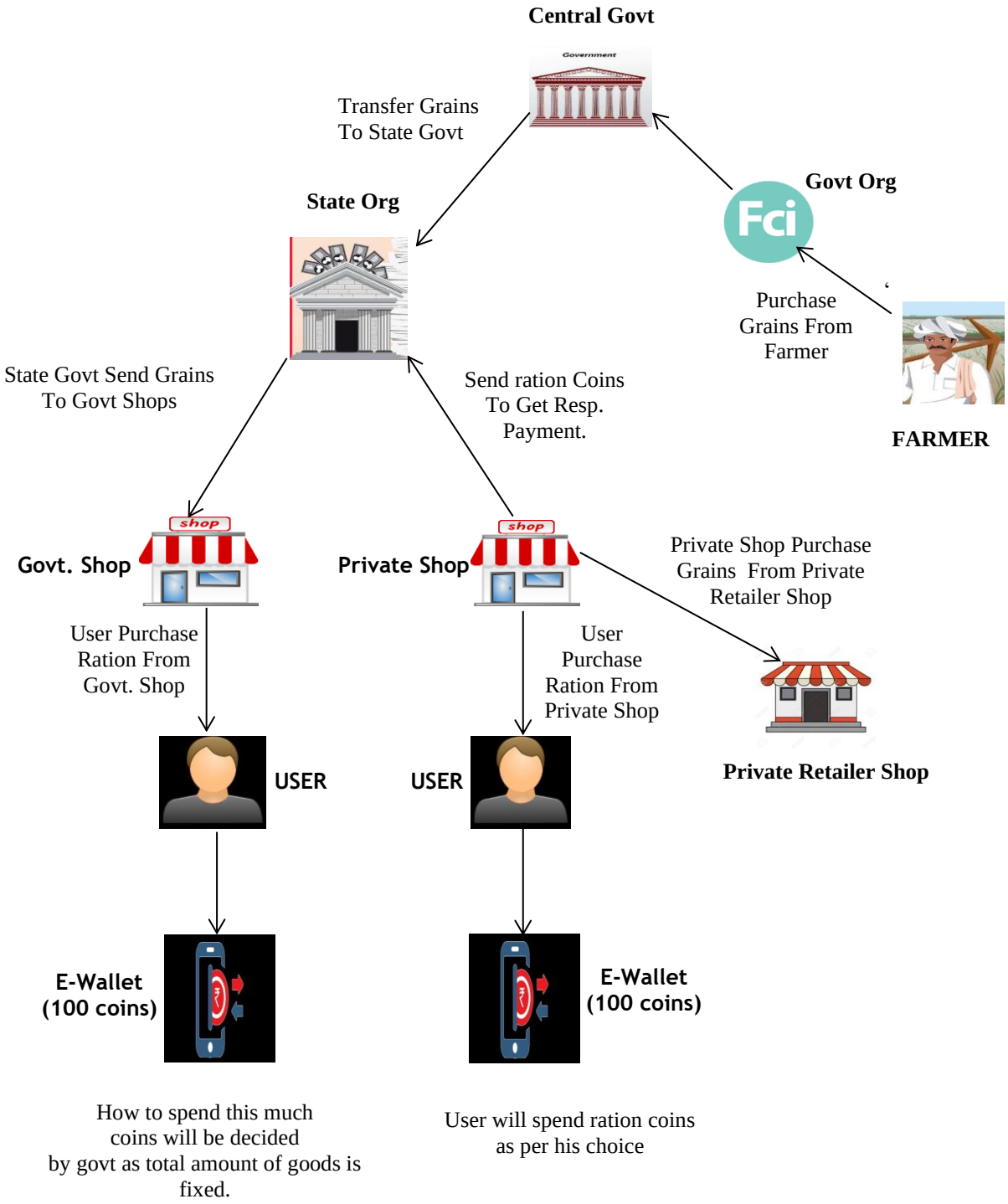
Farmers will provide their grown food grains to Government organisation working in the food grains reserve sector. And they inturn will give the quota of food grains and other items to Central govt. for the distribution to State govt. The State govt. will distribute the items to Ration Distribution centres across the state and the ration shops will be filled. Now the user has received Virtual ration coins in his account on the app and he will go to ration shop to buy the products by paying using virtual coins. The user can buy from Govt shops or the Private shops respectively. Both the vendors(Government and private) will transfer the virtual ration coins to government and in return get paid for that amount. Government will also get good data on the supply and demand of a particular product in an area of the city so as to get good insight of the necessity and can possibly make changes and work on it.



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IV.DATA MINING TECHNIQUES

1. *K Means Algorithm.*

The Areas of a region must be studied well by the Government as to draw conclusions from the collected data using Kmeans Algorithm.

Proper Data mining techniques will be applied on the database for analysis and getting more information about the Public Distribution System

Initialize k means with random values:
For a given number of iterations
Iterate through items:
Find the mean closest to item
Assign item to mean
Update mean
Get Clusters of Cities

1) The Euclidean distance .
2) The Manhattan distance.
3) Minkowski Distance.

The Above Distances shall be found to use Kmeans for a City Area Analysis

2. *Apriori Algorithm.*

This algorithm will be very useful as to know the items sold or distributed by an individual Distributor and thus making an analysis for the Government the demand for which food grain in that particular area of Particular distributor must be increased. The Frequent Items will be obtained and thus help the government .
The Confidence and Support Count of every item will be calculated

Confidence(A->B)=Support_count(AUB)/Support_count(A)

K means and Apriori algorithms both will be helpful to give government the data required to take proper actions to solve difficulties faced by public. The Data mining will be done on the data gathered from the users to buy ration items using the Android Application.

The algorithms will also help to figure out the low rated ration shops and then take proper action on them. To solve the fake ration card problem the authentication using the Fire base real time authentication for ration card number and registered phone number will be done.

3.2 OBJECTIVES

- To aim for Cashless Transactions by using Virtual Ration Coins.
- To monitor the flow of grocery supply from Government to Public Distributors.
- To improve the current manual ration Card System by automating it and setting up Central database .
- To fight Corruption and Fake Ration Cards.

V. CONCLUSION

In our Approach, we proposed a new method to digitize the Public Distribution System.
It will avoid the corruption in rationing system to a large extent by providing transparency at each level. As there will be no offline/ manual database entry and everything will be central database, it becomes easy for higher authority to cross check the data at any point.Various factors will be solved in account of the Government and healthy relationship with the public will be gained. Authorities can make use of it to see details about various illegal activities going on in the Country and also keep a track on the Products which are in high demand in a particular State

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