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SMART RATION CARD SYSTEM USING RFID AND BIOMETRICS

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ABSTRACT

Public Distribution System (PDS) provides a ration card issued under an authority of the State Government for the purchase of essential customer grains like rice, wheat, kerosene and oil. State Government issues ration cards like yellow ration card, saffron ration card, and white ration card depending on family income. The present ration distribution system has drawbacks like inaccurate quantity of goods, low processing speed, large waiting time, grain theft in ration shop. The ration shop owner illegally uses customer grains without prior knowledge of ration card holders. The proposed system replaces the physical work in ration shop. The main objective of the designed system is transparency based on RFID. The customer scans the RFID card on RFID reader kept at ration shop. Once customer is validated by details, customer needs to enter type of grain as well as quantity of grain. After delivering proper grain to customer, the microcontroller sends the information to customer as well as PDS authorities using Global System for Mobile (GSM) technology.

Keywords: PDS, Fingerprint Scanner, Microcontroller, Biometrics, RFID, GSM

I.   INTRODUCTION

In urban areas, kerosene is distributed to customers in the every month and the ration shop keepers are taking steps to distribute kerosene to customers a minimum of three or four days a week[7]. The Indian ration card is mainly used for purchasing food and fuel. It is an important livelihood tool for the poor people, providing identity and a connection with government databases [8]. The present ration distribution system has disadvantages like inaccurate quantity of grains, low speed, large waiting time, material theft in ration shop [7].

The proposed system replaces the physical work in ration shop. RFID stands for Radio Frequency identification technique is used to prevent the forgery. Now a day this system is online which comes as blessing for the customers who hate standing for long time in queues. In this each customer will be having RFID based ration card which contain customer information including Bank details. These cards having unique numbers. Whenever customer wants to buy some grains he must show his RFID based ration card to shopkeeper.   Each ration shop contain RFID reader which reads RFID ration card, RFID reader used to check customer valid or not. The biometrics will be used in this system. It works for an identification of customer. It stores fingerprints of customer to database.

After verification, shopkeeper needs to enter type of material as well as quantity of grains. After delivering proper grains to customer, the microcontroller sends the data to customer's android application or mobile number as well as taluka and district level authorities using Global System for Mobile (GSM) technology.

The computers would keep updated customers data and provide online information of all stocks available in ration shop. This system will cover the human efforts and also the fraud is detected in that system and the forgery is also removed.

II.   RELATED WORK

This section describes the related work of Clustering of data algorithm and Search algorithm.
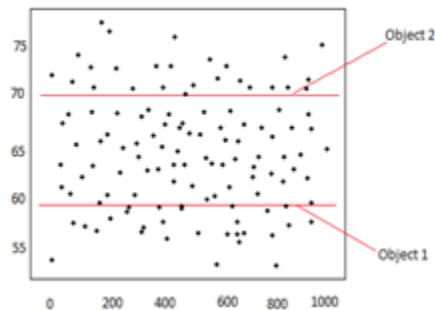**A.   K-means clustering:**

Figure 1. (k-means algorithm) select cluster object randomly.

K- Means clustering algorithm is simple method to create k- set of groups k-means algorithm is runs in following steps

- Initial cluster objects are selected at random
  These represent the clusters
  Imagine random objects are 60 for group 1 and 70 for group 2.
- The squared Euclidean distance from each object to each cluster is calculated, and each object is assigned to the closest cluster.
- For each cluster, the new centroid is computed –and each object value is now replaced by the respective cluster centroid.
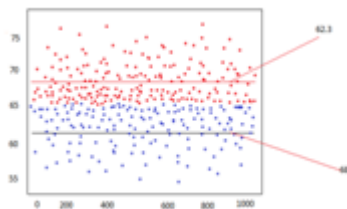

Figure 2. (k-means algorithm) compute new centroids.

- The new mean for cluster 1 is 62.3
- The new mean for cluster 2 is 68.9

Repeat steps 2 & 3 until the centroids no longer move.

B. Heuristic function:

Best first search is simplified A*

A* uses a heuristic function which combines $g(n)$ & $h(n)$: $f(n) = g(n) + h(n)$.

Where,

$g(n)$ Is the exact cost to reach node n from the initial state?

$h(n)$ Is an estimation of the remaining cost to reach the goal?

Algorithmic steps

- Start with holding the initial node.
- Pick the destination node on initial node such that $f(n) = g(n) + h(n)$ minimal.
- If destination node is goal node quit & return the path from initial to destination.

126

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Otherwise,
- Remove a destination node from initial node & all of destination's children, labelling each with its path from initial node.

III. HARDWARE DESCRIPTION

- **Finger Print Scanner**

Biometrics authentication is used in computer science as a form of identification and access control, in our project we will use biometrics to analyses a fingerprint and also the security will be provided by this technique. It has an on-board optical sensor to capture the image, internal 32-bit processor that process the captured image and make it in a stream of bits and stores it in an on board memory [3].

- **RFID**

The RFID is wireless technology that identify the unique items. Signal to reader. The reader receives it. Then the signal is sent for further
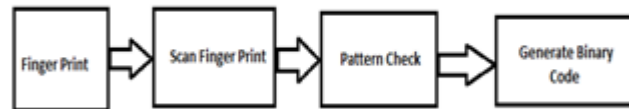

Figure 3: Biometric scanner Process.

Computation of the data.

RFID systems are built up of three components:
- Readers
- Antennas
- Tags (transponders) that take the data on a small microchip.

Communication between the tag and the reader is bidirectional done by the radio frequency (RF). Passive RFID tags are used as ration card which does not require any external power supply. The tag antenna receives the RF signal from the reader and retransmits the signal to reader.
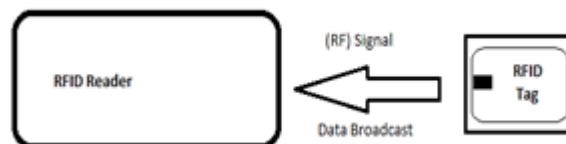

Figure 4: Communication between RFID tag and Reader.

- **GSM**

The GSM stands for (Global System for Mobile communication) this module is consists of GSM modem. Global System for Mobile communication describe protocols for 2G digital cellular networks which is used by mobile phones. It accepts SIM cards, and operates over mobile phones. It uses frequencies between 890-915 MHz UL and 935-960 DL (Band of 25MHz). Using this GSM modem, SMS is delivered automatically to the customer after buying grains from ration shop.

IV. ARCHITECTURE

Figure. 5. Architecture of System

There are four users in the system:
- Ration card registration officer
- Ration shop user
- Ration shop keeper
- Taluka and District level admins

System uses RFID and Biometrics techniques for verification and validation of users. Every Customer is provided with a RFID tag which is registered by the government authority that is ration card registration officer. At the time of grain distribution at ration shop, initially customer is verified by fingerprint scanner and RFID Card. User id checked with the database provided by the government which is stored in the micro controller. Once verification is successful, customer is ask for a select type of grains and quality required. Customer get grains as per his requirement. GSM module will send information in form of SMS to customer as well as government authority that is taluka level and district level. Current grain stock in ration shop is shown by using LCD.

- Ration Card Registration Officer

Ration Card Registration Officer Register information of the customers who want to buy grain from ration shop. Registration officer also gives the RFID card which contain particular customer identification and also take thumb print of customers. Also he can enroll the RFID and Thumb number and remove or add the members from register.

- Ration shop user

Once customer is registered in Ration card Registration office he get his own RFID card has unique number. Also he can get statistical report with the help of android application and mobile phone messages.

- Ration Shop Keeper

Ration shop keeper distribute the grains to all customer as per their verification by thumb print and RFID card. Also he send the all information about remaining stock and historic data of costumers to Government Authorities.

- Taluka and District Level Admins

Taluka and District level admins check the details about ration shop and distribute only required stock to ration shop. Also this admins store the data about all customers and shop keepers.

V. CONCLUSION

The proposed system is very secure and transparent than existing system. Fraud data entry in the ration database can be maintained with the help of this smart ration card system. Only authorized person (shopkeeper, Taluka and District level admin, registration Officer) can maintain the database. Customer can be authenticated using RFID Card and thumb detection. The proposed system will be more transparent, reliable than the existing ration card system.

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