

IOT BASED SMART PUBLIC DISTRIBUTION SYSTEM

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Introduction:

The system of providing basic domestic commodities on subsidy to poor families in developing countries like India is an important aspect to meet fundamental requirement of people. The existing public distribution system in ration shops requires manual measurement of quantity and maintenance of record of transactions.

Previously some of the changes were proposed to make PDS smart like, initially the user is asked to swipe the RFID card. The Raspberry pi compares the unique tag ID with the data base. If the tag ID matches, the user is asked to scan the finger. Once the user identity is authenticated, the commodity and quantity can be selected through voice commands. If the commodity and quantity are valid, the system dispenses the valid commodity. A message is sent to the user giving the details of the transaction. However, if the authentication fails the system waits for valid authentication.

The project titled IOT based smart public distribution system is an automatic method of distribution of commodities to authenticated card holders. Also, the details of transactions made are maintained in a database. To counter these fraudulent activities this system is developed which incorporates the following features,

- Fingerprint authentication algorithm used to identify a particular user making the system secure.
- The commodity and its quantity need to be selected using android application.
- Predefined information about the amount of ration to be distributed.
- Automatic ration distributing mechanism.

Objective:

The aim of this system is to build an automatic and convenient system to protect the interests of the public by countering the malpractices. The main purpose of the system is to implement fingerprint matching algorithm for authentication of the user, which in turn reduces the widespread corruption, misuses of cards and to reduce the time complexity of the manual data entries. The system is used to protect the products of fair price shop in black markets.

Methodology:

I. Hardware Tools

Following components are used to achieve desired functionality.

1. Fingerprint module: A fingerprint module is interfaced with the Raspberry pi. A minutiae algorithm is used to process the fingerprint obtained from the module.
2. Raspberry pi: The details of each user of the family are enrolled in the database. Raspberry pi takes the serial number from reader and access corresponding record in the database in accordance with the thumbprint identification. Figure 1 shows the Raspberry pi embedded board.

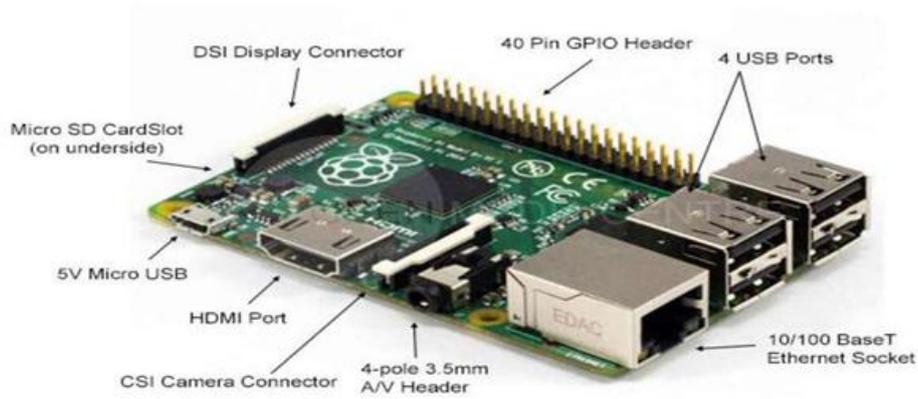


Figure 1: Raspberry pi embedded board.

3. DC Motor: The motors are used to control the valve arrangement (i.e.to open and close the valve).
4. Hydraulic Valve: The purpose of flow control in a hydraulic system is to regulate speed. The motor operates the hydraulic valve to dispense the oil to the cardholders. Figure 2 shows the cross sectional view of a hydraulic valve.

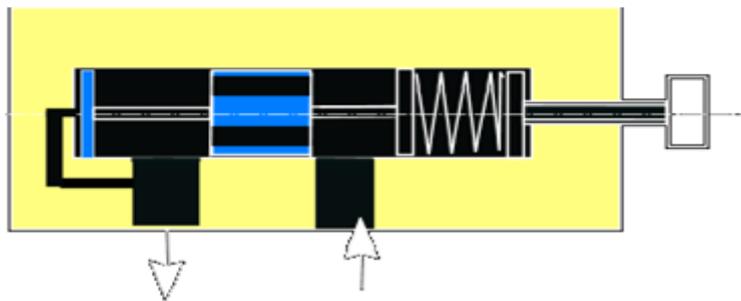


Figure 2:Cross sectional view of hydraulic valve

II. Flowchart of system

The methodology of system is explained in Figure 3 which shows the flow chart of IOT based smart public distribution system. Initially the user is asked to enter the ID and password given to them in the app. The Raspberry pi compares the unique ID with the data base. If the ID matches, the user can view their profile which will have details of their transactions. Then user is asked to scan the finger. Once the user is authenticated, the commodity and quantity can be selected their itself using buttons given. If the commodity and quantity are valid, the system dispenses the valid commodity. However, if the authentication fails the system waits for valid authentication.

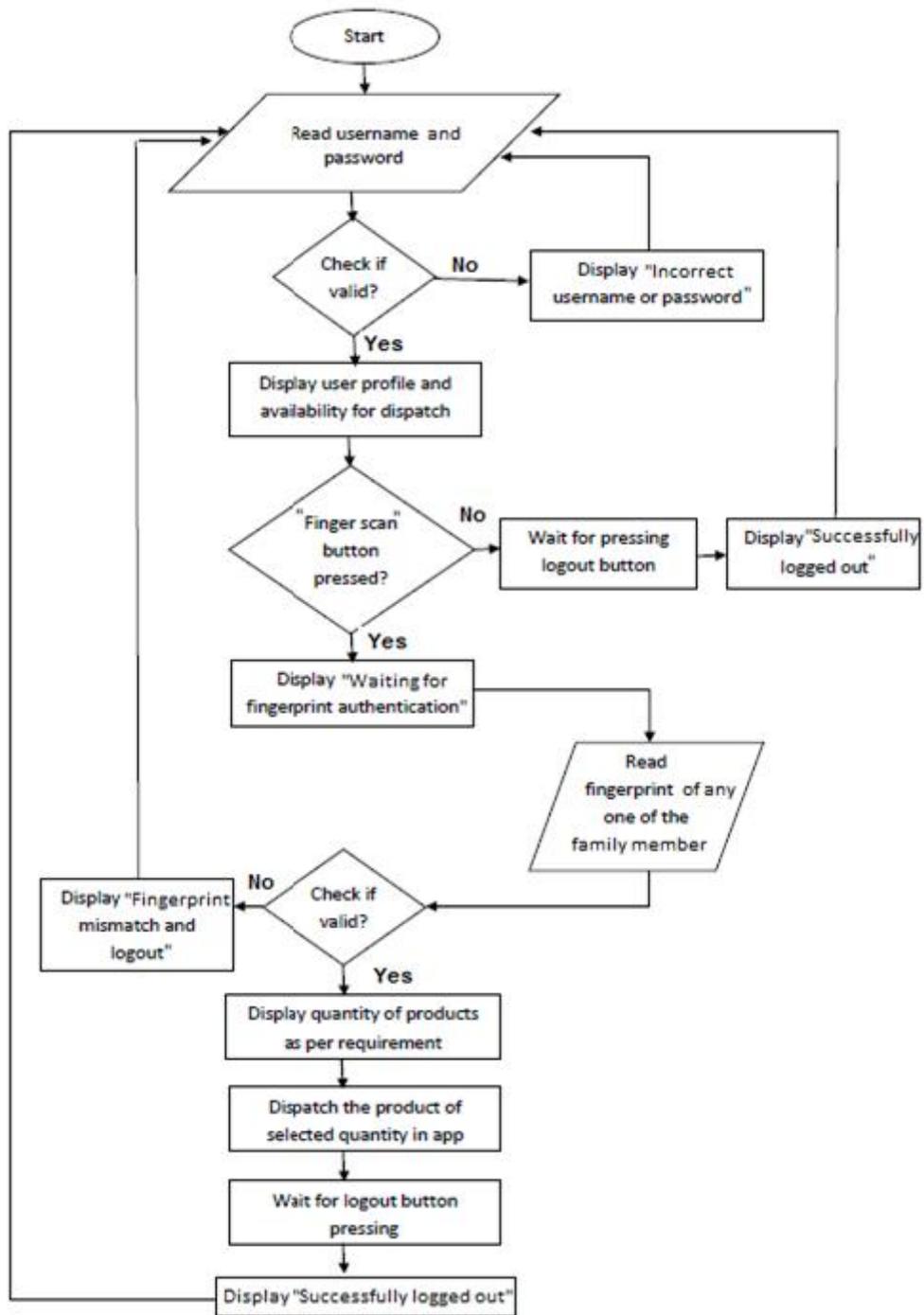


Figure 3: Flowchart of IOT based smart public distribution system.

Results:

This section illustrates the snapshots and results of the overall project. The Figure 4 (a) displays user login page where they have to enter ID and password to see their profile. Figure 4 (b) shows different options to the user. They can purchase, enroll their fingerprint, delete unwanted fingerprint or view the profile. User can enroll his/her fingerprint by pressing enroll button as shown in Figure 4 (c).

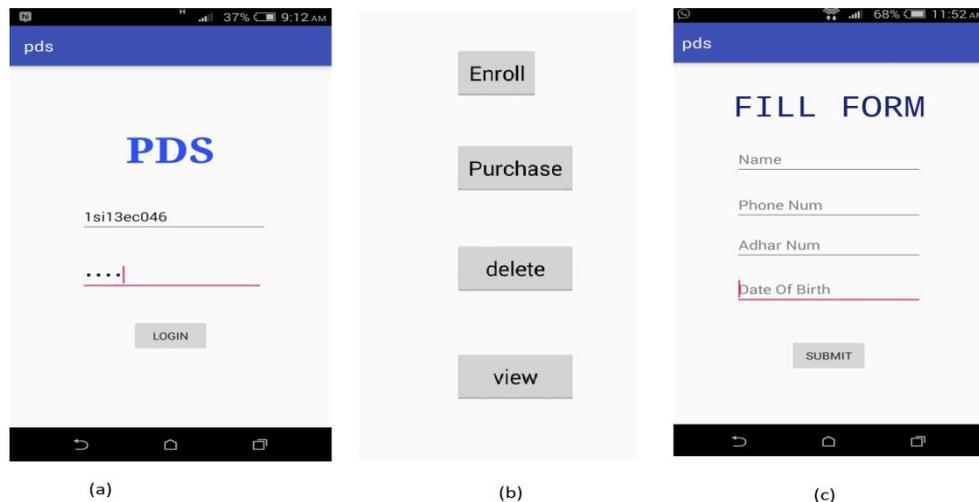


Figure 4: Snapshot showing an overview of android app.

If the user selects purchase on the android app, system will ask for fingerprint authentication, if matched it says template is found otherwise no match found is displayed as shown in Figure 5.

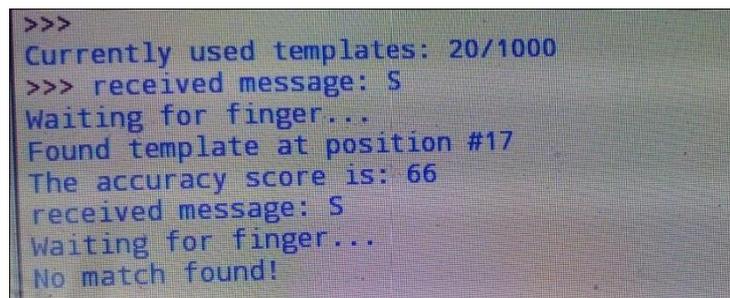


Figure 5: Snapshot shows fingerprint matching.

If the user is authenticated successfully, then commodities can be dispensed. Figure 6 shows 1 Kg of each commodities being dispensed, if user needs another kilograms of each, then they have to press the respective commodity button once again.



Figure 6: Snapshot showing rice, sugar and oil being dispatched

Conclusions:

IOT based Smart public distribution system is an automation system and it is recompense over the present fair price shops. Fingerprint authentication uses Minutiae extraction based algorithm, which makes the system more secure and accurate. It eliminates fake ration card holders and protects the interest of the common people ensuring the country's food security. By means of its performance one can reduce the corruption level. Selecting the commodity and quantity through the android app will make the system more smart and robust. It will help the country's economy to reach new heights. The automated PDS is easy to implement and requires much less hard work when compared to the other system. Using this system one can avoid the malpractices because there is no manual operation and also all information is stored in a database. So this system will be really helpful to the people.

Scope for the future work:

Project can be further extended by making the payment to the purchased commodities online. Thus it will make system more automatic. Also, distance of communication between server and client can be increased using internet.