



Fully Automated Ration Shop Monitoring and Controlling System Based on Embedded Processors and Controllers

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ABSTRACT: Public Distribution System (PDS) introduces the Fair Price Shop (FPS) for distributing the grains to the poor peoples. In now a day's this PDS involves corruption and proscribed smuggling of goods. So this thesis suggest an approach to mechanize all the manual jobs in ration shop and the whole thing from data entry to weighing to thrashing is prepared by machines and the people have no hand in that. This provides high reliability and there brings a sense of straightforwardness to the consumers. Further, as all the data maintenance and data allocation is prepared by the computer and it can keep track of all the data and the entire process of data maintenance is taken care of by the PC and hence no possibility of mistakes and practically no manual work. This scheme used to reduce the workers burden and easily maintain the stock details. Before going to the ration shop, first users show the stock availability details based on IOT. Here instead of a Ration card, a smart card will be used for the purpose of authorizing and subsequently the person's finger Vein will be Scanned and also matched for authentication. After that the consumer to select the materials and then dispense the materials based on ARM Processor. At this time solar panel is used to produce the power supply for PC and all other electrically organized equipment's. After distributing the materials the government head office receives the delivery Report from the PC with the help of GSM. Finally the stock details are maintained in database and update the details regularly to the government portal. This thesis also used to provide the connection between shop keepers and consumers by using data mining techniques along with CRM.

KEYWORDS: Internet of Things (IOT), PDS, Smart Ration card, Finger Vein Scanner, personal computer, ARM Processor, solar panel, Data mining, GSM, KEIL C, MATLAB.

I. SYSTEM DESIGN

PDS scheme is mainly used to distribute the materials to all consumers with free of cost or low cost. In now a days this PDS contains lot of corruptions. To overcome this some authors introduce some innovative technologies. Poonam N.Jadhav et al. [4] have introduced a use of RFID and GSM technology in Ration Distribution System. The main objective of this system is the automation of ration shop to provide transparency. But here RFID card is not secured one. Because any user will use this RFID card and also this card does not contain any password production. To overcome this problem here implements Smart Card instead of RFID card. This Smart Card is highly secured one and easily identifies the user's data. This proposed system consists of personal computer for easily identifying the user's details and maintain the stock details. With the help of controller to get the material details easily from PC and distribute the materials to the consumer properly. Here some sensors are used to provide the materials properly without any loss. The block diagram of proposed method is shown in fig. 1. This method is highly suitable for secured and computerized materials distribution. This system mostly performed to reduce the corruption and reduce the wastage of time. Here they consist of the ARM processor, smart card, motor driver, LCD and GSM. The proposed system expresses sharing of grains as well as liquids. For distributing rice or sugar they use stepper motor and weight sensor. For providing oil or kerosene they use solenoid valve and liquid flow sensor. At this time object Detection sensor is mainly performed to identify the object from the consumer and to distribute the materials to the consumer's things. Suppose if user's wants packet items like Tea Powder, Max Box...etc. means the Stepper Motor Will rotate and move the Container Belt. If container belt moves means they distribute the Packet items to the correct user. For this kind of

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Vol. 5, Issue 5, May 2016

process we distribute the materials to consumers with accurate weight and to avoid the corruption. This proposed method also helpful for the shop worker to easily maintain the stock details without any hand written and also avoid the shop workers burden.

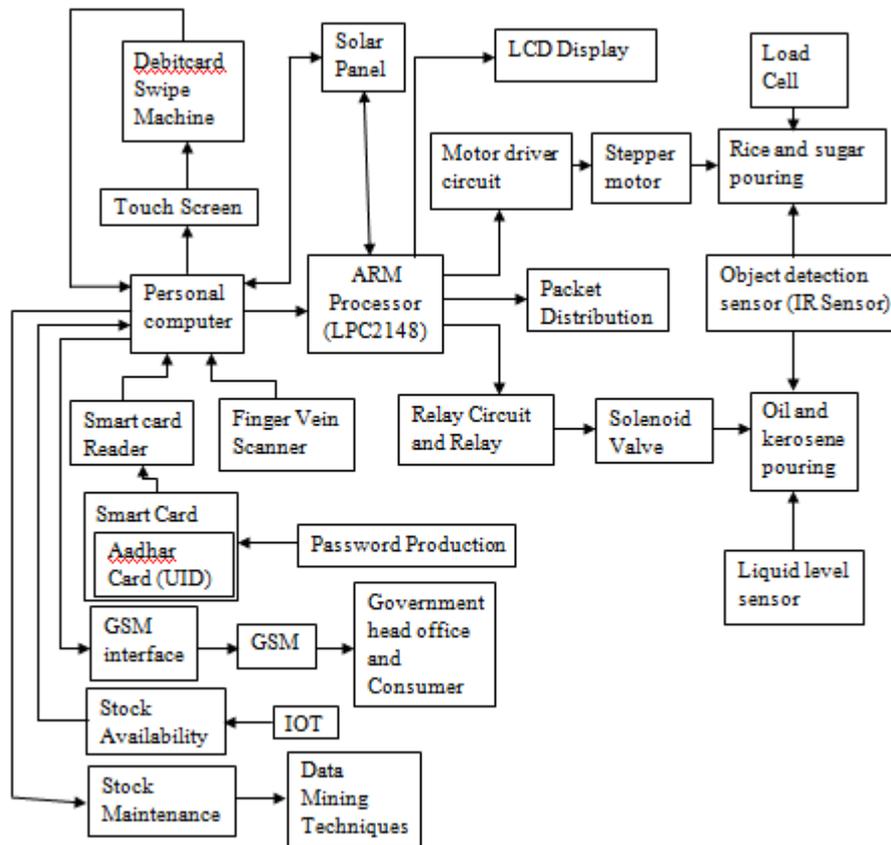


Fig. 1 Block Diagram for Fully Automated Ration Shop monitoring and Controlling System

II. SYSTEM WORKING

First the user gets the smart ration card instead of a traditional ration card for secured ration materials collection. Before going into ration shop, users easily know the available current stock details from home itself with the help of Internet of Things. And also here Smart card used to easily identifies the user's details. In a smart card corner the designer will print the serial number based on family details. The shop worker provides the schedule to the user based on serial number. On that day only the user buys the materials. The last two days per week are allotted for distributing the materials to all users. This process is regularly reducing the user's time wastage; reduce worker's stress; proper maintenance....etc. Finger Vein Scanner is used for high secured purpose. User's to insert our smart card into smart card reader means the PC search the database and to provide the user's details. Subsequently the user thumbs our Finger Vein into the Finger Vein Scanner. If the recent finger vein and saved finger Vein are matched means PC shows the user's quantity details. After verifying the user's details the PC displays the particular user's quantity details. Then the user selects the goods with the help of the Touch Screen. With the help of this, the user will pay the amount automatically after the selection of materials. Here consumers use the debit card for secured payment. At this time we planned to design both the debit card and users identification card are combined into a single smart card. The payment process success means the PC sends commands to ARM microcontroller recording the material distribution. If user select Rice or Sugar means commends passed to motor driver circuit and they control the stepper motor. Stepper motor rotates clockwise to distribute the rice. For distributing sugar, stepper motor rotates anti clockwise. If the user selects



International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 5, May 2016

liquid item means the controller sends command to relay circuit. At this time relay switch ON and pass commands to the solenoid valve. The valve will be open and distribute the liquid items. Here Load Cell is used for calculating the material's weight exactly and dispense the materials properly. They are primarily executing the correct quantity of materials. The IR sensor is one type of object detection sensor. This is very useful for distributing the materials correctly. The sensor senses the object and gives the instructions to the controller. Then only the controller distributes the materials. Here liquid level sensor is used for calculating the liquid levels and distributing the liquids accurately. If the liquid level low or high means the buzzer will on automatically. Suppose if user's wants packet items like Tea Powder, Max Box...etc. means the Stepper Motor Will rotate and move the Container Belt. If container belt moves means they distribute the Packet items to the correct user. After material distribution the PC maintains the stock details and intimates the stock details to the government head office with the help of GSM. During the Power Demand time we provide the power supply to some important equipment's with based on solar panel. For this kind of process, we reduce the corruption and avoid the fake stock entry. These contain all details regarding users and easily maintain the stock details with the help of Data Mining Techniques. This method used to avoid crowd, long waiting period, properly maintain customer details and stock details. Now fig. 2 shows the basic way of ration providence to consumers and also to avoid the stress of shop workers. This fig. 2 also used to elaborate the process of ration materials distribution to users.

III. STEPS IN PROPOSED SYSTEM

For distributing the ration materials they follow some steps. They are,

- User's get smart ration card from government.
- Shows available Stock Details from Web portal based on IOT.
- User's insert smart card and enter password.
- If password matched means user thumb our finger into finger Vein Scanner. Otherwise they again insert our smart card.
- After successful verification user select the type of materials.
- After material selection user will pay the amount with the help of debit card.
- After payment verification, PC sends quantity details to ARM microcontroller.
- If user select rice or sugar means the controller pass commands to motor drive circuit and control the stepper motor.
- Stepper motor rotates clock wise means they distribute rice. Otherwise they distribute sugar.
- If user selects oil or kerosene means the controller pass commands to relay and relay opens the solenoid valve. Then they distribute the materials.
- If user wants Packet items means container belt will be move and distribute the items.
- After successful materials distribution PC maintains the stock details based on data mining techniques and then PC interface with GSM.
- Finally GSM send the stock Details to User's and Government.

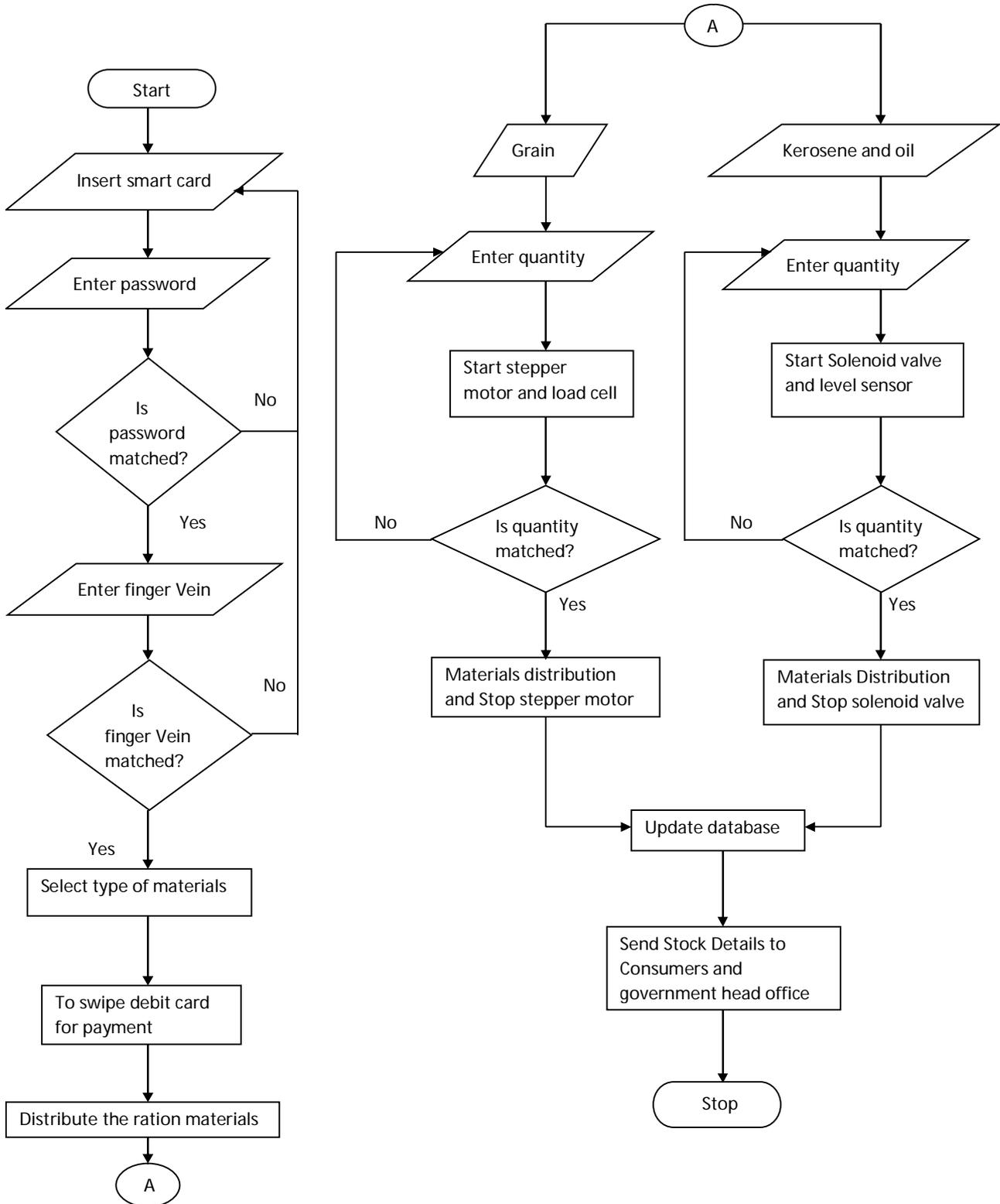


Fig. 2 Flow Diagram of System Working

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 5, May 2016

IV. HARDWARE RESULTS DISCUSSION

First user's select the correct finger Vein image and smart card Image with the help of MATLAB. Here we use the MATLAB for the authentication purpose. At this time Fig. 3 explains the basic module of Finger Vein input Detection and also Fig. 4 explains the basic module of Smart Card Input Detection.

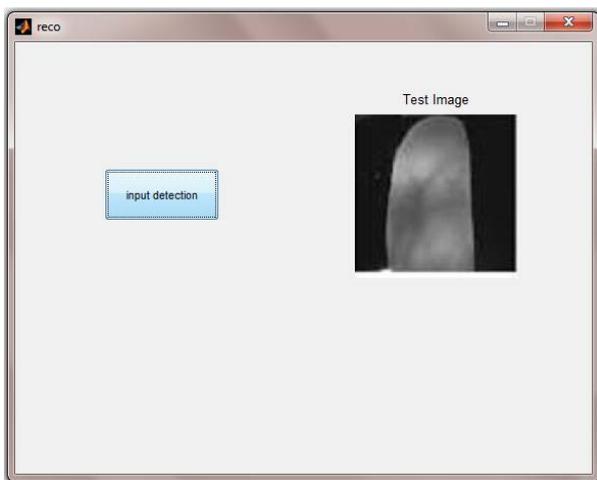


Fig. 3 Finger Vein Input Detection

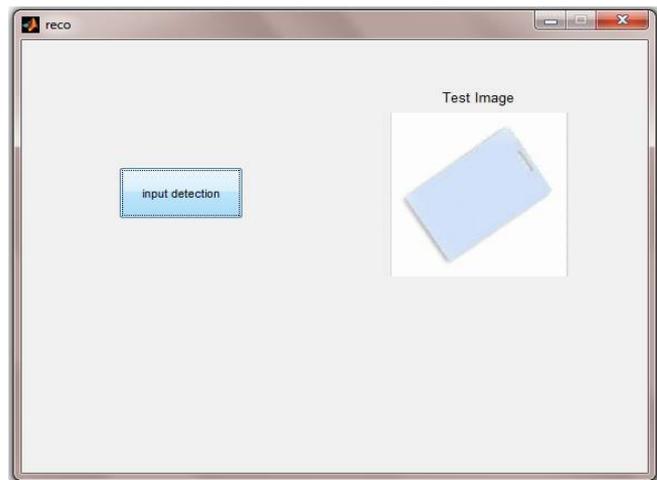


Fig. 4 Smart Card Input Detection

After the Successful verification PC will communicate with ARM7 Processor and also PC will give the Users Details and also they show the currently available stock details. Here fig. 5 shows the basic module of hardware setup. In this hardware setup they are mainly consider some important hardware's. that's are RS232 for communicating PC and Hardware, ARM7 for controlling the Hardware and also provide the Accurate output, Keypad for selecting the Materials, ULN2803A for interface with Stepper Motor and ARM7, GSM for communicate Ration shop and Government head Office. Fig. 6 elaborates the basic functions and working module of the Weighing Machine. This machine mainly used to calculate the weight of the materials.

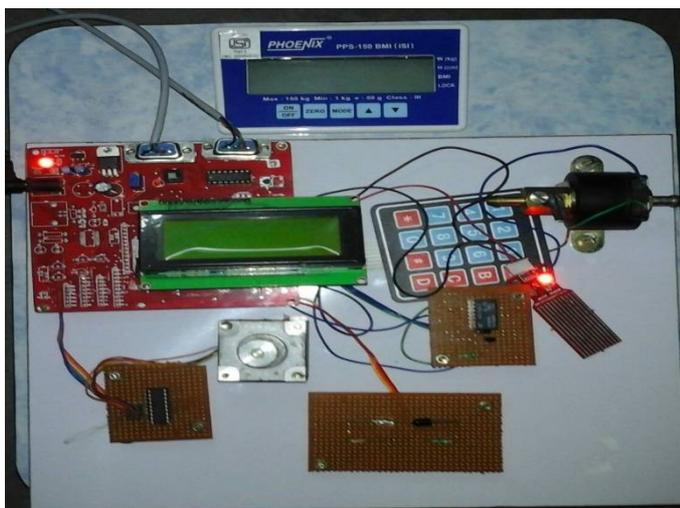


Fig. 6 Working of Weighing Scale



Fig. 5 Hardware Setup

Fig. 7 shows the Hardware execution mode. After Verifying users Details, PC will send the available purchasing stock details to the ARM7. With the help of Keypad user's will select the stock Details. If user wants to Rice means they enter 1 in Keypad. Then stepper Motor Automatically Rotate in Clock wise and distribute the Rice. After current

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 5, May 2016

quantity of Materials Distribution, the stepper Motor will be automatically stop with the help of IR sensor for avoiding the Wastage of Materials. Suppose if user selects Sugar means the Stepper Motor will be Rotate in Anti Clockwise and distribute the sugar. If user's wants oil items means they select 3 with the help of keypad. Then solenoid valve will be automatically open and distribute the oil items. Here Liquid Level sensor is used to identify the flow and the level of liquids in a particular container for avoiding the Wastage.

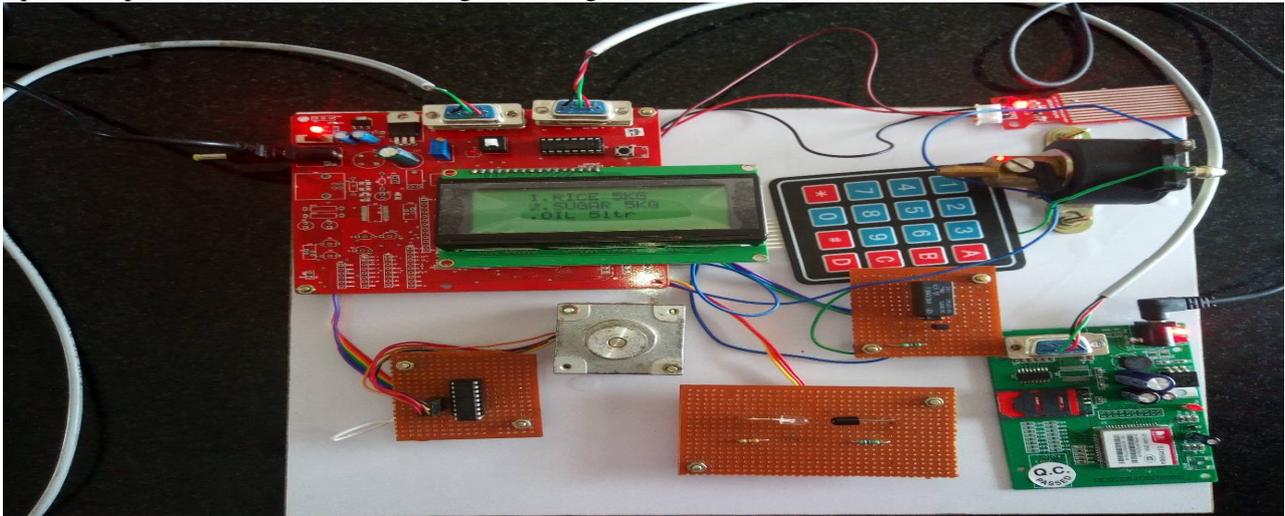


Fig. 7 Execution Mode

S.No	Quantity Details	Selection
1	Rice	1
2	Sugar	2
3	Oil or Kerosene	3

Table. 1 Materials Selection

Finally ARM7 will be Interface with GSM for communicate both user's and Government Head office. After the successful materials Distribution, Shop workers will be intimate the currently available stock details and also distribution details to the individual user's as well as government head office. Here fig. 8 shows the basic communication between the ration shop and individual consumer's based on GSM.

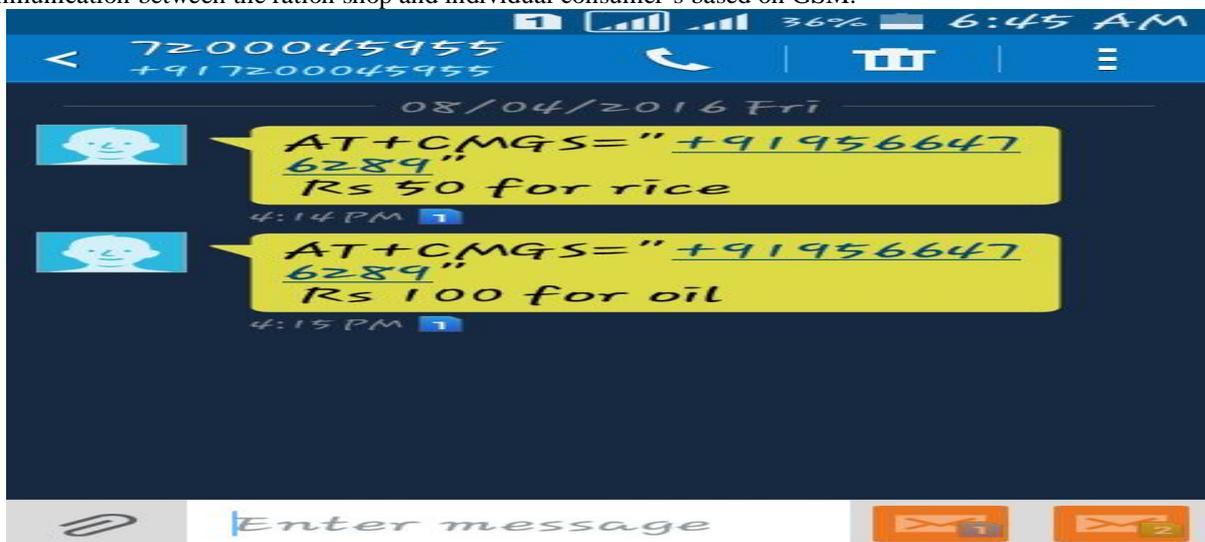


Fig. 8 Basic Communication Between the ration shop and individual consumers



International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 5, May 2016

V. CONCLUSION

In ration shop several drawbacks have occurred like material robbery, corruption, malpractices, long waiting time to collect materials and low processing speed. To overcome the above problems the mechanized rationing scheme is needed. Here the automatic ration shop has proposed to use smart card and to control the distributing the materials. In the proposed method smart card is used in place of ration card and send the stock details to head office using GSM module. The simulation is done with the help of proteus software and the results were obtained. It is found that the results are in line with the expectation. Hardware part of the project has completed and the obtained results were compared with software results. Both the results were same to distribute the materials accurately. This method automates all the process associated with the ration shop without any human's intervention. Hence this is corruption free, prevents the theft, forgery and reduces the consumer's time. Also the proposed method helps to maintain the stock details easily and the same is conveyed to the consumer. It improves the overall function of the ration shop and reduces the burden of shopkeeper as well as the consumer.

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