

e-Ration System Using RFID and GSM Technology

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Abstract:

This paper proposes the advanced Ration Distribution System, named as "Smart Ration Distribution and Controlling". Huge amount of Govt. money get wasted due to corruption in the conventional Ration Distribution System. This paper implements a simple PDA device (personal data assistant) with RFID tag used as an e-ration card in place of a conventional ration card. This PDA device is similar to the ticketing machine used by bus conductor or bank pigmy agent and the e - ration card is similar to swipe card. The Subscriber has to use this card instead of a traditional ration card to get ration from the dealer. Efforts are put together from our side to combat corruption and to have better management of public distribution system.

Keywords- Corruption, GSM, PDA, RFID, Ration Distribution System

I. INTRODUCTION:

The ration distribution system is one of the largest government's economic policies in India. Its main motto is to provide food grains (sugar, wheat, rice, kerosene etc.) to the people at affordable rates. The network of the ration shops is spread all over in India to provide food security to the people. This distribution of ration is controlled and monitored by central government, along with the state government. But it has so many limitations. Most of the ration shopkeepers keep fake ration cards with them. Due to fake ration cards, the dealer receives the extra ration from higher authority and he sales it into the open market. The dealer may not provide a sufficient amount of food grains to consumers. Most of the time people are not aware of the availability of ration in ration shop. The dealer may sale ration at higher rates than recommended by the government or he may do wrong entries in register. In this way, in the current situation we are facing problem of corruption in public distribution system. There is no such effective system through which government gets acknowledgement of consumption of food grains by people.

ORGANIZATION OF PAPER

The paper possesses three sections. First section consists of abstract and brief introduction about paper. The second section describes the development of hardware and software in detail. And last section covers the future scope along with conclusions and references for further details

II. LITRATURE SERVEY:

Recently Vikram et. al. [1] has proposed Smart Ration Card System. The smart card is modified as a smart ration card by coding Microprocessor chip present in it according to the requirement. The smart card contains unique barcode. When the consumer visits the ration shop, he has to show this card in front of barcode reader. Dealer verifies the smart card & accordingly delivers ration. S.Valarmathy et. al. [2], Mohan et. al. [4] and Sukhumar et. al. [7] has proposed an automatic ration material distribution based on GSM (global system for mobile) and RFID (Radio Frequency Identification) technology instead of a ration card. This system is automatic

and provides ration without interference of human. In this system various sensors are used to measure and dispense the commodities.

Dhanashri et. al. [5] and Neha et. al. [3] has developed web enabled superior public distribution system. The system remotely monitors the outlets of various goods and vehicles, providing ration to ration shop. In this system, subscriber has to access the website every time they desire to get a ration.

Sharma et. al. [6] has proposed new ration distribution system using biometrics, face recognition and voice recognition system.

In automated ration distribution system the setup is to be installed in every ration shop. In present scenario more than 0.5 million ration shops exist in India. So it is very costly to have an automated PDS and it is a tedious job for illiterate people operating such complex system. On the other hand barcode based systems are not secure because the dealer can have duplicate barcode on the basis of which fake ration cards can be made.

III. PROPOSED SYSTEM:

This system comprises of PDA device and RFID tag so called as an e- ration card.

A. Hardware Setup

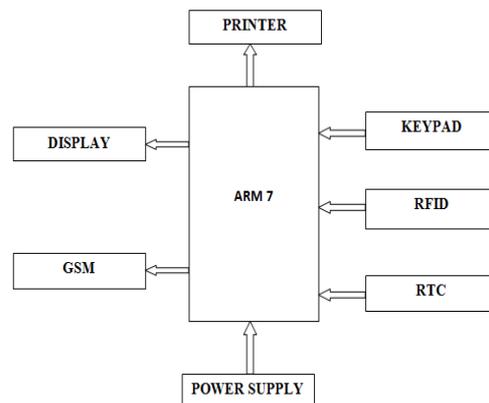


Figure 1: Block diagram of PDA device

ARM Controller

The circuit is built around 32 bit ARM 7 RISC (reduced instruction set complexity) type of controller. It consists of 64 pins with two ports of 32 bits. It uses Von Neumann architecture with three stage pipelining. It has high code density and supports 16 bit (thumb instruction set) as well as 32 bit enhanced instruction set. Each instruction executes in a single cycle with a clock speed of 80MHz. The various modules such as GSM, RFID, LCD display, RTC, keypad and thermal printer are interfaced to it to form a complete PDA device. Software Development

RFID

The RFID uses wireless technology to identify the object. It consists of RFID tag and the reader. The bidirectional communication between the tag and the reader is accomplished by the radio frequency (RF) part of the electromagnetic spectrum to carry the information between an RFID tag and reader. Passive RFID tags are used in this system as an e-ration card. It does not require any external power supply. The tag antenna receives the RF signal (13.56MHz) from the reader. This received signal is rectified and supplied to the chip to power it up. Now tag retransmits the signal to reader. The reader receives it. Then the signal is sent for further computation of the data.

GSM

The GSM (Global System for Mobile communication) module consists of GSM modem. It is a standard developed by the European telecommunication standard institute to describe protocols for 2G digital cellular networks used by mobile phones. It accepts SIM cards, and operates over a subscription to a mobile operator, just like mobile phones. It uses frequencies between 890-915 MHz UL and 935-960 DL (Band of 25MHz). Through this GSM modem, SMS is delivered automatically to the subscriber about availability of food grains at the ration distribution center and about the transaction.

RTC (real time clock)

The system uses the RTC (real time clock) HT1381 serial timekeeper chip (8 pin DIP) which provides time, day and date information. It is operated in 24-hour mode. It has several registers to store the corresponding information with 8 bit data format. It operates on either 500 KHz (VDD=2V) or 2MHz (VDD=5V) separate clock frequency so that it keeps working even though PDA machine is in the off state. It uses a serial I/O transmission method to interface with ARM 7 controller.

Thermal Printer

Thermal printer is a digital printer which produces an impression on thermal paper. The paper rolls over printing head to have an image on it. The thermal paper turns black in color when it passes over hot rod of printing head. Printing can be done using two colors (black and red) at two different temperatures. Here system uses direct thermal printer with black ink to have receipt of transaction.

Keypad

Here PDA device uses a standard alphanumeric keypad with 4 programmable function keys and 1 power key with menu function. The keypad has a backlight, so that it can be used at night also.

B. Software Development

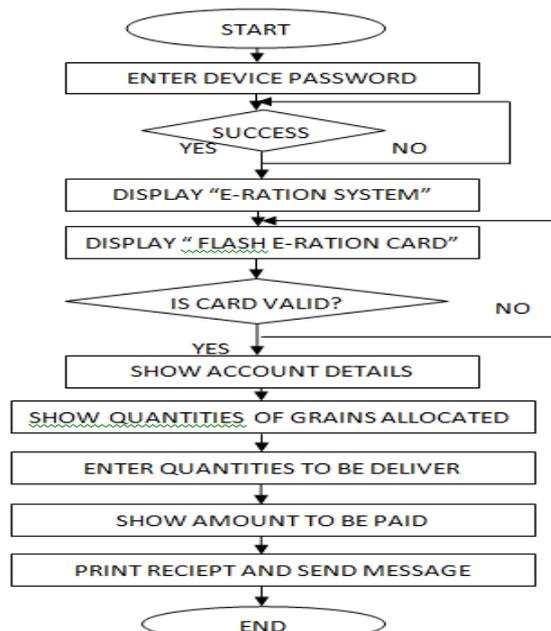


Figure 2: Software Development Flowchart

When device is switched on it demands device password. If device password is incorrect, it demands it again and if it is correct, then it displays the name of an application that is “e-ration system”. Then it displays message “flash e-ration card”. When an e-ration card is shown in front of PDA device the RFID reader checks its validation. If it is invalid, then device again displays “flash e-RATION CARD” and if it is valid then it shows the name of the ration card holder and details of account such as food grains allocated to his family, rates recommended by Govt. etc. Then it demands the quantities to be delivered. After entering the quantities it shows the amount to be paid. Then it prints receipt and delivers a message to customer about the transaction.

C. Application Development Flow

Initially code is written in an embedded C

Above figure 4 shows the prototype of the proposed PDA device which is to be provided to each ration distribution center.

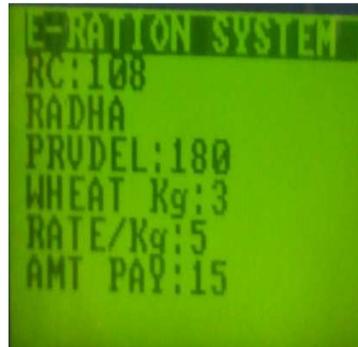


Figure 5: Display of device

Above figure 5 shows the screen of PDA device displaying details of the subscriber. Here RC stands for ration card number and PRVDEL stands for previously delivered ration in Kg. Radha is the name of ration card holder. A detail shows that she has demanded 3 Kg of wheat and rate recommended by a government is Rs.5 per Kg.



Figure 6: Ration receipt

Above figure 6 shows the printed ration receipt which gives detail information about the transaction.



Figure 7: Delivered SMS

Above figure 7 shows the system generated SMS which is received by subscriber after the transaction.

V. CONCLUSION

Using this proposed modern system we can have Better management of the ration distribution system. Govt. can have indirect check on the availability of the ration to the beneficiary. It is transparent and has control over prices of some commodities in the open market. Dealer will not be able to keep fake ration cards with them. System helps to modernize traditional rationing and combat corruption up to a great extent.

VI. FUTURE SCOPE

For better authentication of subscribers, a biometric system can be used. The provision can be made such as PDA device will update data directly to server online.

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