

RFID BASED ACCESS CARD FOR PUBLIC ENROLLMENT AND DISTRIBUTION SYSTEM

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Abstract: In the present days, many illegal activities are taking place in ration shops, which are meant to distribute the commodities to the people who are in below the poverty line, as they are manually operated and may also consumes a lot of time. Here RFID technology i.e., RFID tags are introduced, instead of ration cards, which consists of all the details about the card holder like family details, type of card and its validity etc. When a person entered with his RFID ration card into the ration distribution shop, his tag is read by using RFID reader and displays his personal data with photograph on ARM 9 screen. If the tag is out dated or any duplicate of the original card then buzzer will get 'ON' by displaying in ARM9 screen as it can't be accessed. Implementation results along with the algorithm are included herewith.

Index Terms: RFID Reader, RFID passive Tags, ARM9 (mini 2440), AES algorithm.

I. INTRODUCTION

In present days it is required to provide the easy and secured access in the ration store because it is easy to duplicate the ration card by changing their original details. As the data is not stored in any of the database or systems there may be a chance of misusing it. In this paper RFID card is used as ration ID card. Consumer information is maintained in the data base in server system, and it can be accessed only with the Consumers RFID which can avoid the man made errors. Thus this paper improves the security performance because it is difficult to create duplicate RFID card. The objective of this paper is to identify the consumers in ration store by using the RFID card instead of using the ration card.

A Ration Card is a very useful document for Indian citizens for the distribution of ration like rice, pulses, etc. It helps to save money by aiding in the procurement of essential commodities at a subsidized rate. RFID is the special type card which has inbuilt the embedded chip along with loop antenna. This embedded chip consists of 12 digit card number. RFID reader is the circuit which generates 125KHZ magnetic

signal. This magnetic signal is transmitted by the loop antenna connected along with this circuit which is used to read the RFID card number. In this paper RFID card is used as ration card. So each consumer has the individual RFID card for a family. RFID reader is interfaced with MINI 2440.

When the consumers show their RFID card to the reader, the reader will read the number and send to mini2440. The database is opened and displayed on screen. The database contains the book information for those consumers such as consumer name, occupation, address, ID number etc.

If the RFID card is not valid for that particular consumer, the micro controller will display the "Authentication Fail" on the touch screen and also activate the driver circuit for alarm. So the alarm makes the sound for indicating the Authentication Fail.

By using this system government can also know about the details like population, who ever are using their ration card and how much load is to be distributed without calculating. In this way we can avoid many of the illegal activities in our country.

II. RELATED WORK

In this section, ARM9, Passive tags and RFID reader are reviewed.

A. RFID tags:

In this paper RFID technology is introduced in place of ration cards. RFID stands for Radio Frequency Identification. RFID is one member in the family of Automatic Identification and Data Capture (AIDC) technologies and is a fast and reliable means of identifying objects. RFID module consists of 2 main components, they are Interrogator and Transponder. The Interrogator (RFID Reader) is used to transmit and receive the signal and the Transponder (tag) that attached to the object. This RFID tag is composed of a miniscule microchip and antenna.

There are three types of RFID tags, they are passive, active or battery assisted passive. An active tag has an on-board battery and periodically transmits its ID signal. A battery assisted passive (BAP) has a small battery on board and is activated when in the presence of a RFID reader. A passive tag is cheaper and smaller because it has no battery. In this paper passive tags are used. As we require for less distance communication between the RFID Reader and tags. An RFID Reader can read through most anything with the exception of conductive materials like water and metal, but with modifications and positioning, even these can be overcome. The RFID Reader emits a low-power radio wave field which is used to power up the tag so as to pass on any information that is contained on the chip.

B. RFID Reader:

An RFID reader can be classified according to the type of tags we use. As in this paper we are using passive tags a Passive Reader Active Tag (PRAT) system is used. This passive reader which only receives radio signals from the passive tag which is activated whenever the tag enters into the reader area. A reader contains an RF module, which acts as both a transmitter and receiver of radio frequency signals. The transmitter consists of an oscillator to create the carrier frequency; a modulator to impinge data commands upon this carrier signal and an amplifier to boost the signal enough to awaken the tag. The receiver has a demodulator to extract the returned data and also contains an amplifier to strengthen the signal for processing.

A microprocessor forms the control unit, which employs an operating system and memory to filter and store the data. The data is now ready to be sent to the network. Besides the interface to the reader's antenna, a parallel or serial communication can be used between the Processor and the Transceiver unit. Various programming options make the TI's RFID Transceiver suitable for a wide range of proximity (communication distance to Transceiver - Tag: <10cm) and vicinity (communication distance to Transceiver - Tag: >50cm) RFID applications. The RFID Transceiver required here for communication is of <10cm. Thus we use passive reader. Fig 2 shows the block diagram of RFID reader and Fig 1 shows the RFIS module.



Figure 1: RFID reader module

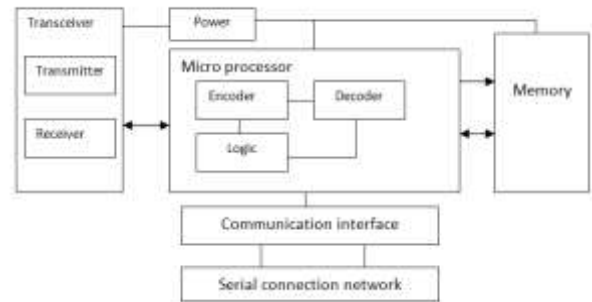


Figure 2: RFID reader block diagram

C. ARM9: (Mini2440 / S3C2440 ARM9 Board)

The S3C2440A is developed with ARM920T core, 0.13um CMOS standard cells and a memory compier. Its low power, simple, elegant and fully static design is particularly suitable for cost- and power-sensitive applications. It adopts a new bus architecture known as Advanced Micro controller Bus Architecture (AMBA).

In this paper ARM 9 is used in order to store the consumer's data and display them on screen whenever the tag is shown to the RFID module. Fig1 shows the Friendly ARM i.e Mini2440 and Fig4 shows the circuit or the design of mini 2440 below the screen.



Figure 3: Friendly ARM



Figure 4: Mini2440 internal diagram

III. ADVANCED ENCRYPTION STANDARD (AES):

The Advanced Encryption Standard (AES) is an encryption algorithm for securing the data. In January of 1997, a process was initiated by the National Institute of Standards and Technology (NIST), a unit of the U.S. Commerce Department, to find a more robust replacement for the Data Encryption Standard (DES)

and to a lesser degree Triple DES. The specification called for a symmetric algorithm (same key for encryption and decryption) using block encryption. It was to be easy to implement in hardware and software, as well as in restricted environments (for example, in a smart card) and offer good defenses against various attack techniques.

In this paper AES algorithm is used in order to secure the data from Hacking. Even though RFID tag cannot be replaced by its duplicate there may be a chance of changing the data without informing to the officer, which is an illegal act. In order to avoid such type of acts here we are introducing AES algorithm. Each and every RFID tag consists of their unique identity number which is known as plain text. This plain text is added with some key by generating a new text known as cipher text. Fig 5 explains the generation of cipher text from plain text.

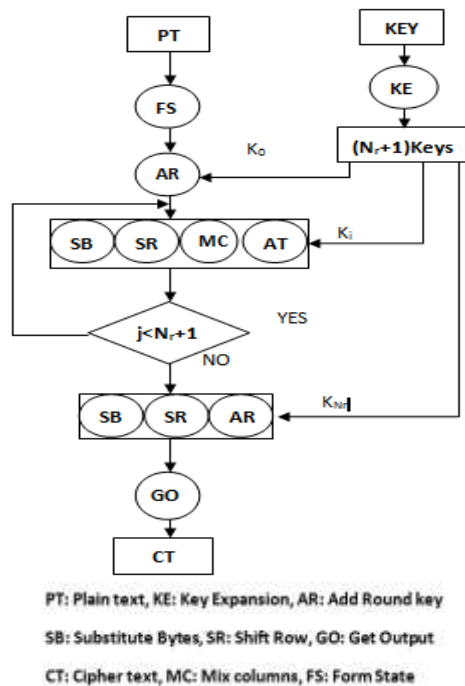


Figure 5: AES general flow chart for explanation

IV. SYSTEM IMPLEMENTATION AND RESULTS

In this paper we are using passive tags as ration cards. These passive tags are used rather than active tags, as their detection range is more appropriate for the application. These passive tags are smaller and lighter than active tags. In the application scenario of our system, the detection range should be from 0 to 10cm or so. However, the RFID tags.

We have to put all the object tags close to the reader one by one. The details of the card owner will be stored

in the ARM9 memory block. Whenever the card is brought near the reader or a module it will display the details of the card holder like type of card, family details, date of birth and their image on the screen.

Here we are also using AES algorithm in order to prevent the data from hacking and not to reproduce a duplicate card of it. In this project we are using four types of ration cards for demonstration, pink card, white card, expired card and a card which is going to expire. If the detected card as pink card it will display its expired date and the things to be distributed for that particular card. A slip is generated for the things to be distributed. Similarly for the white card it will display the stock to be given by generating a slip for it. If the detected card is going to expire then it will give alert that “your card is going to expire” If the detected card is invalid card it will display as “Authentication failed” by using buzzer as its indicator.

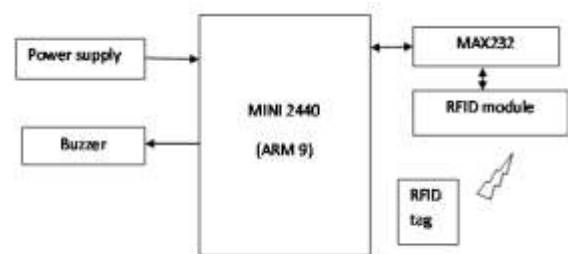


Figure 6: Block diagram

In real time application it consists of a single server and multiple users. As the data is stored in the server system the user will only read the card and supply the list it displays. By using this type of system people can take their ration from any of the ration shop. and the data is stored in the server data base as the number of people who took their ration, stock distributed, amount of stock which is left out or having any of the shortage in stock. As we are using this system government can also know about the details like population, who ever are using their ration card and how much load is to be distributed without calculating. In this way we can avoid many of the illegal activities in our country.

The algorithm is as follows

Step1: Initialization of process

Step2: check the tag, it is valid or not.

Step3: if the card is invalid card then display it as an invalid card by activating the buzzer.

Step4: Else if the card is valid then go to the next step.

Step5: Check the type of card either it is a pink card or white card.

Step6: If the card detected by the reader is a pink card then display the card holders details on the screen.

Step7: Generate a slip for the things to be given to the pink card holders

Step8: If the card detected is a white card then display their details on the screen. By generating a slip for the things to be given to the white card holders.

Step9: if the detected card is an invalid card or expires card then display as “Authentication failed.

Step10: if the detected is near to be expired then have to get alert as card is going to expire

Step11: stop the process.

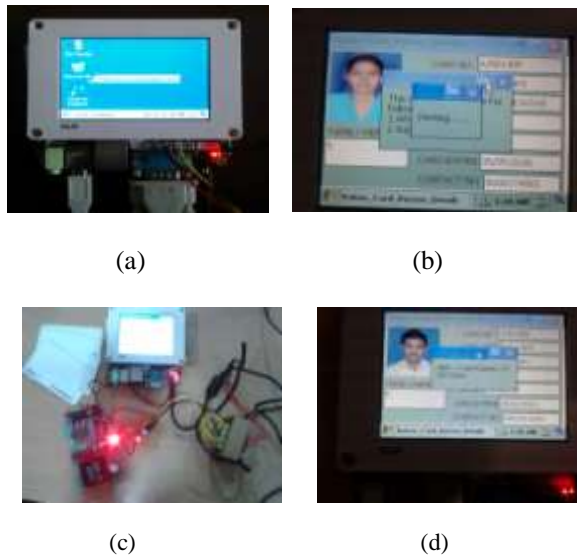


Figure 7: Result Images

- (a) Mini2440
- (b) Generating and printing a slip
- (c) ARM9 connected to RFID reader and RFID tags
- (d) Alert message is generated for a card which is about to expire

V. CONCLUSION AND FUTURE SCOPE

This paper is used to provide the easy access in the ration store. It improves the security because we can't make the duplicate RFID card. We can avoid the man made errors.

We can also use these cards in the form of credit cards in future by adding extra features. Instead of using separate cards like identity card, credit card, ration card or aadhar card we can use only single card that is RFID card. This will be helpful for our govt. to know about the details regarding our population, who ever are using their ration card and how much load is to be distributed without calculating. In this way we can avoid many of the illegal activities in our country.

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VII. BIOGRAPHIES



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