Automated Public Ration Distribution System

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Abstract: In our existing government ration distribution system, each family have a ration card. Based on the annual income, ration is allotted to each family. For purchasing ration user has to show first his/her ration card to the ration owner. Owner check allotted quantity for that particular ration card holder and then one can get the things. This process is time consuming. Also it is person dependent and people stand in a very long queues to get the grains and the ration. For the person who cannot read or write may not get the actual amount of allotted ration. Ration card holders in rural are complaining that ration is not supplied to them in time and in right amount. To avoid time delay in the current ration distribution system it is necessary to develop a automated public ration distribution system which will not be a person dependent .To overcome corruption by the ration shop owner and remedies we are developing the automated public ration distribution system based on biometric authentication of the family head. This is based on the fingerprint authentication of family head and message regarding the transaction at ration shop is sent to registered user mobile number by using GSM. Depending upon the allotted quantity ratio will distributed through the dispensing model.

Keywords—Biometric authentication, Fingerprint scanner, Registered mobile number, Message, GSM.

I. Introduction

In our traditional ration distribution system, ration is distributed on the basis of ration card. But there are many frauds and fools in this system. Government is taking some actions to avoid this misdoings but these actions can also be circumvented by unauthorized persons. In order to avoid frauds and to make system more transparent, we are proposing a modern ration distribution system. The most importantly, this system is automatic, there is no need of human efforts. Also ration will be distributed on the basis of biometric authentication of one. Thumb scan of family members are already taken for future record. At the time of ration distribution, on the basis of biometric authentication, scanner can easily decide who belongs to which family and accordingly ration will be automatically distributed via dispensing motors. Another advantage is that you can keep record on total quantity of ration coming in and going out of

system. The mistakes done by owner of ration shop can be avoided by modern system.

In this paper section II describes the literature related to the proposed system. Section III gives methodology and actual implementation idea of the system which contains component description. Software used in system design are in section IV. Section V & VI are for design & result resp. Finally section VII is for conclusion & future scope.

II. Literature Survey

Madur and Nayse [1] have proposed automated rationing system based on radio frequency identification of the user. Here each user is provide with RFID card and password. By using RFID card and entering the password user can authenticate themselves. In this methodology user go into the amount of Kg he want to extract. First account check is done and if he have sufficient balance then ration is given to him.

Bala Karthik [2] has described the system for user to buy the ration or products by just scanning the RFID card. User is authenticated by sending a one time password text to the user mobile which has to enter in a keypad. User can check his purchase details in dedicated website.

Dr. Dube and Perampalli [3] have proposed the system which consist of two units server and client unit. Server performs customer identification, customer alerting as well as alerting shop owner about arrival of grain. The admin have access to server by logging in into the system. Through the client unit user can interact with the system.

Shelar and Patil [4] have proposed the system based on the RFID and GSM. Every family provided a RFID card. If customer is validated by password ,the system asks the consumer to select product and the quantity of product through keypad. Once quantity is given, SMS is sent through GSM.

Sukumar et al. [5] have proposed the system which replaces manual work in public ration distribution system. Here PLC similar to ATM is used. Conventional system is replaced by using RFID card.

Pingle and Borule [6] have proposed ration distribution system using smart card. All the details about user like Aadhar number used for authentication. Here RFID reader interfaced with microcontroller and PC via RS 232.
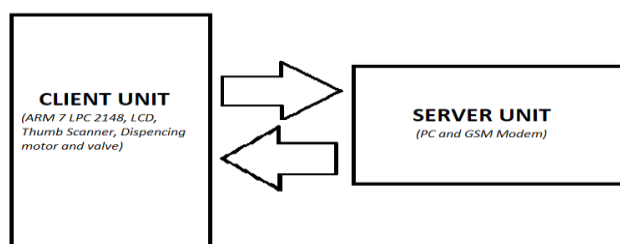
III. METHODOLOGY

Fig 1. Block Diagram

This Proposed automated public ration distribution system uses fingerprint biometric authentication. All the details about the ration card holders such as fingerprint details, user mobile number, ration quantity and prices of ration units are stored on the government's sever. Here the system mainly consist of two parts Client unit and Server unit. Client unit is at the ration shop. Client consist of microcontroller, LCD, grain and kerosene dispensing unit, fingerprint scanner. Server unit has PC, GSM modem. User is authenticated using fingerprint scanner interfaced with microcontroller. The fingerprint details are sent to the server unit. Server unit checks its database. If user is valid then corresponding details of user are sent to client unit. Depending upon the allotted quantity of ration, ration is distributed to the user. After completion of the ration distribution message is to the user's number.
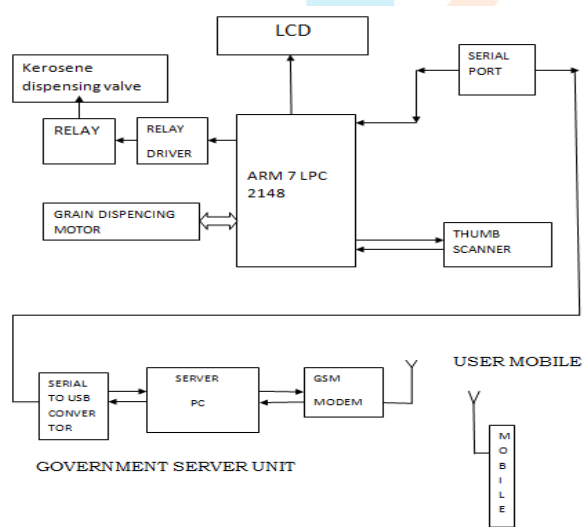
A. Proposed System

Fig 2. Proposed System Architecture

Here in the client unit ARM7(LPC2148) is interfaced with the thumb scanner using serial interface. Thumb scanner is used for biometric authentication of the person. This information is sent to the server. Server checks for user details and sent to the client unit if user is valid. The information regarding allotted ration quantity, price of same is displayed on the LCD display. After payment by user to the ration shop user ration shop press cash received switch. LCD alert the user to

ready with his bag for grain collection. When user is ready grain dispense switch is pressed which dispense grain. Same is done for kerosene. For grain dispensing DC motors are used and for kerosene dispensing solenoid valve is used. After successful completion of transaction message is sent to the user's mobile number through GSM.

B. Component Description
- ARM7(LPC2148)
    i. 32 bit microcotroller in tiny LQFP64 package.
    ii. 8-40 kB static RAM & 32-512 kB flash memory.
    iii. 1/2 10 bit ADC & single DAC.
    iv. Two UART, two I2C bus, SPI, SSP
    v. Up to 45 of 5V GPIO pins & 21 external interrupts.
    vi. CPU voltage range of 3-3.6V.
- LCD
    i. EADIP162-DNLED: Green with LED backlight.
    ii. 4-8 bit data bus interface.
    iii. Operating voltage +5V & current 150mA at +25C.
- Fingerprint Sensor R305
    i. Integrated image collecting with algorithm chip.
    ii. Optical type with USB 1.1/UART interface.
    iii. 0.3 sec verification speed & 0.5 sec scanning speed.
    iv. Storage capacity of 250.
    v. 3.6-6.0V operating voltage & 90mA working current.
- Solenoid valve
    i. Internally piloted, 2-way normally open valve.
    ii. 8W coil with 0-145psi operating pressure.
- DC Motor
    i. Torque vs speed & current relationship is linear.
    ii. Protection against overload & locked rotor.
    iii. Protection for EMI/RFI caused by the PWM control.
    iv. Precaution for dynamic breaking & reversing.

IV. SOFTWARE DESCRIPTION

A. Keil

The Keil 8051 development tool are used by embedded software developer to solve the complex problem faced. When starting a new project, simply select the microcontroller you use from the device database and the micro-vision IDE sets all the compiler, assembler, linker and memory options.

B. Proteus

The Proteus Design Suite is a software which is used for schematic capture, simulation and PCB layout. It is used for printed circuit boards. Microcontroller simulation is done by using either hex file or debug file. It can also be used for 3D vision.

C. Multisim

In order to carry out the major steps in circuit design flow, Multisim software is used. It is a schematic capture and simulation application of National Instruments Circuit Design Suite of EDA(Electronic Design Automation).Here it is used to design power supply.
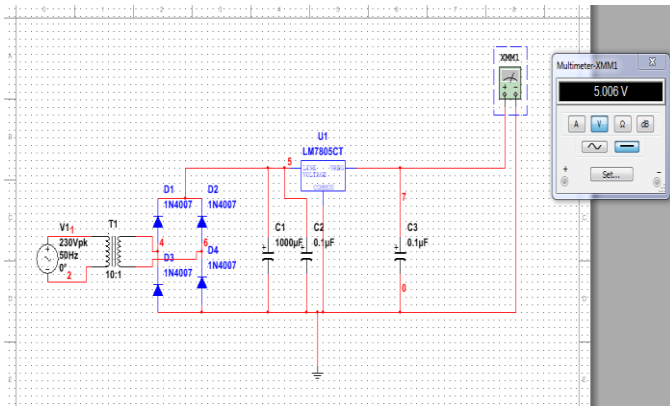
V. DESIGN

Power Supply Design

Fig 3. Power Supply Simulation Using Multisim.

The first and basic step in designing any system is designing a DC power supply. The steps for designing power supply are
i. Determine the voltage ratings for the components in the system.
ii. Total current from the supply.
For filter capacitor,

$$C= (Il * t1)/Vr$$

Vr= ripple voltage(ripple voltage 10% of output voltage).
Il = load current.
T1= time during which the capacitor being discharge by load current.

$$\theta1= \sin^{-1}[(E0\ min)/ (E0\ max)]$$

$\theta1=60^0$
T1=8.4ms.
I1=116.2mA.
C=976.04 µf=1000 µf.

VI. RESULTS

First of all power supply is designed by considering all the components requirements in the system. After successful completion of the power supply simulation of the components are done in the Proteus. As Fig.4 shows the interfacing & simulation of the LCD display which is showing the initialization message 'Place finger for the authentication '.Proteus also used to take the PCB layout.

Fig. 5 shows actual implementation of the proposed model in which fingerprint scanner is interfaced with LPC2148 through RS232 connector and LCD is at initialization. When the valid finger is scanned on scanner system will go for next stages.
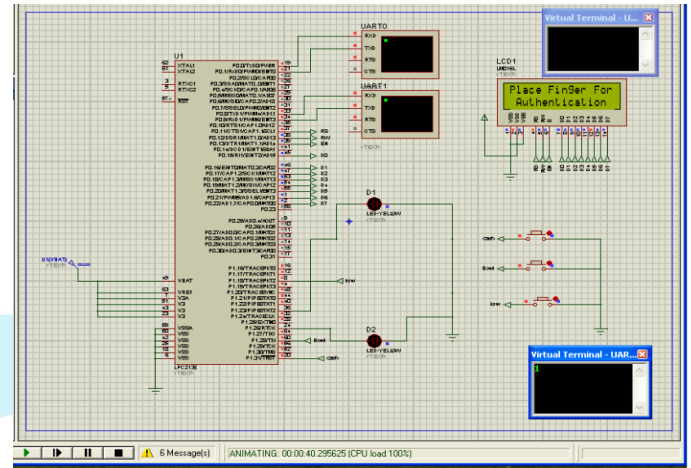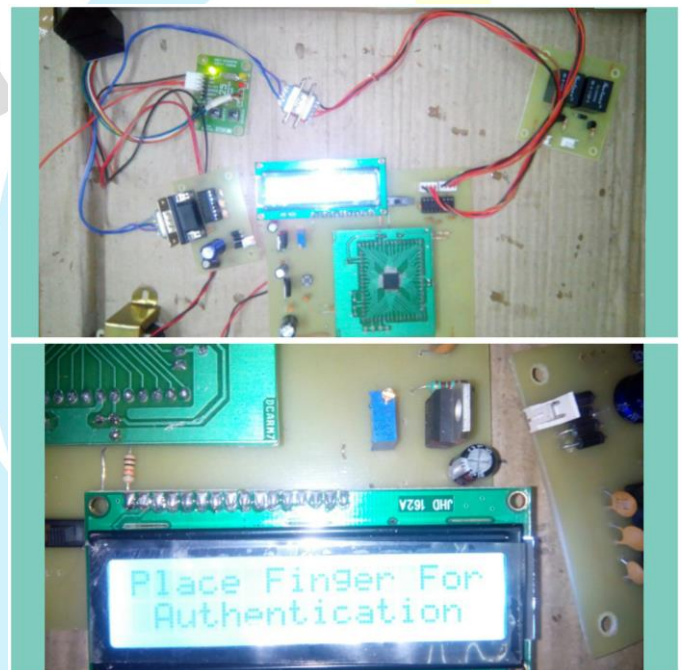

Fig 4. LCD Simulation Using Proteus.

Fig 5. Implementation of The System.

VII. CONCLUSION

This proposed modern ration distribution system is more transparent than traditional system. Another big advantage is that government can indirectly notice the quantity of ration coming in and going out of system. There is no need of human efforts and mistakes done by human in traditional system can easily eliminated in modern system, thus minimizing the corruption in system.

This technology can be used in modern ration distribution system by owners of shopping malls and supermarkets for easy distribution of items. Instead of ration many another

items can be distributed by making some changes in this technology. Users may get 24*7 availability of items in future

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