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Real Time Monitoring and Logging of Ration System with QR Code Scanner

Prof. Ajay S.Wadhawe[1], Mayuri Kumarrao Shirsat[2],

Head, Dept. of Electrical, SSIEMS, Parbhani, Maharashtra, India[1]

Research Scholar (M.E.), Dept. of ECE, SSIEMS, Parbhani, Maharashtra, India[2]

ABSTRACT: Real time monitoring and logging of ration system with QR code scanner is the application system developed to mitigate today's high degree need of poverty line people, which is cheapest grains availability and that too in minimal cost .Now at present government is offering sugar,rice wheat and edible oil and rockel for different kind of users like APL, BPL ,and Antyodaya people categorized based on annual income. To fulfill the demand of such greedy people government introduced fare price shops that is public distribution systems where in these poverty line people get ration card enlisting their details like name, amount of grains in kg or oils or kerosene quantity ,their residence address etc. We in this research introducing use of QR code printed on AADHAR card which is unique identity of each customer .This will help us to minimize fraudulence. The existing systems have drawback that we cannot monitor the distribution plus stock availability with each distributor. We will be tracking this through the application and status can be logged. We have tried to minimise the human intervention as much as we can so as to run the system efficiently and cost efficiency is also considered here.

KEYWORDS: LPC2148 ARM7 Development Board, GSM SIM 800 modem,android application,.net application,load cell,oil pump,Gsm800 module

I. INTRODUCTION

Ration Distribution through public distribution shops ,that is PDS is the very much focussed and sensitive task in India as India being the world's second most populated country, its natural to face resource scarcity in large.This is always in news because of certain corruption cases and black marketing issues. Its really tough job to fulfill the demands of such huge population where majority fall in poverty basket. So identifying the needy and fulfilling the respective needy demands is quite difficult and this needs to be revised periodically. as the poverty basket composition changes time to time. this problem somehow solved through cheap selling goods at specially designed government outlets named as ration system or public distribution system. System came in reality for the sake of poor needy helpless orphan etc kind of public. who can available the facility of government and make like stable to a some extent. The basic purpose of PDS is violated by some self motivated distributors and officers lobby. the stock which is unsold or not reported is going to black market for self intrest.if 500 kg are allocated for particular village at large, distributor could declare it 400 kg only and remaining 100 kg to be undisclosed. Here we are proposing to involve government to overcome these issues and minimize corruption and black market selling. As current running system maintain ration register to be updated by the shopkeeper itself. There are chances for mistake and adulteration. These could be inaccurate quantity, different entity than the government's actual assigned item, giving to the favoured people that is biased approach, creating induced scarcity etc.Since its manual any one can deviate the process.

So we are proposing the system in which we will be atomizing the whole process and eradicating the human intervention. In this conventional system running today we will replace all human work by automation and will be kept at Ration shop. here ration card named document will be given replacement by AADHAR card. Here the character recognition in the coded QR code which is printed on AADHAR card is done. Government is involved in the process, we can develop an application through which we can monitor distribution system and we can connect this through GSM module. Distribution section involves the human help to manually weigh each item then deliver it to individual, but here are the increased risk of adultration,false weights and in some personal clashes straightway deny for grains or oil or kerosene. As per government agency reports, it is estimated to be 54% approx loss that do not reach PDS, do not

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reach target. There are many other issues like huge queue outside the shop, time required to do each step manually. So we will automate this mechanical process as well.

We will have an automated rationing system. "IOT based Ration Storage and Distributing System " means distribution of essential commodities to a large number of people through a network on a recurring basis in an automated way. The Concept is to prevent adultration,corruption and Black marketing , Biased approach etc .The system designed would be cost effective ,power saver and time saver ,efficient.

in terms of feasibility ,this system is a vast concept and interesting tasks to perform and feasible in many aspects technical as well as other. Here, we are designing a system where a person displays his/her Aadhar card and our system gives the Ration to that user. Thus corruption is reduced. We have put some interlocks in the system which can not make the distributor deviate the procedure ,when he tries to do scam or mislead the weighing system ,system will put on the buzzer and further process is hanged on until normal standard procedure is adapted. Thus We have a system which is simple in working and less complicated to work, power efficient and hardware at the minimal is required.

II. LITEARTURE SURVEY

The Poor people are given the ration cards which are classified as per user status as APL,BPL,Antyoday etc and of different colour like White, Orange and more. At the same economic classification of each individual is monitored on year to year basis. So there comes the renewal issues and man hours are involved to do same. this has been overcome by K.Balakarthik proposed the "Cloud-Based Ration Card System using RFID and GSM Technology" [1], where user has to just flash his card in front of RFID reader in the ration shop. after flash user will receive random password on his mobile which needs to be entered for authentication process via keypad and if correct he is allowed to get the ration.this is validated via updating the details of customer and his purchase.The current distribution systems are totally manual giving scope for smuggling and corruption. A.N. Madur et.al. Developed the "Automation in Rationing System using Arm 7" [2], S.Valarmathy Proposed the "Automatic Ration Material Distributions Based on GSM and RFID Technology" [3].in both these systems user s are provided the RFID card which will store all hard copy data of ration card .He has to first be aunthencated and after he comes to know the respective quota of the month and if there is balance then automation valve will open the grain distributuion till his quota fulfills. And account is updated. Same information is available to customer on his mobile via sms.here valve and weight sensors mechanism implemented. Many time it is being obereved that shopkeepers doing malpractices in updating the stock register and giving the fake quota details. so Rajesh C. Pingle et.al. Suggested the "Automatic Rationing for Public Distribution System (PDS) using RFID and GSM Module to Prevent Irregularities" [4], in this automated system ration card is replaced by smartcard having all the details about users including their AADHAR number for user authentication. If we involve government in the process by connecting the system at ration shop to a central database (provided by government.) via GSM and RS232. Hence it is possible to prevent the corruption and irregularities at ration shop. The existing PDS system causes overcrowding at ration shop due to manual work so S.Sukhumar et.al. Proposed the "Automatic Rationing System Using Embedded System Technology" [5], in this system they proposed the use of PLC for automation. Also they used the smart card and involved government via giving connection through GSM modules. This will give up to date information to government and update database.To achieve visibility, efficiency,productivity and ease of access Mahammad Shafi et.al. Suggested the "e– Ration Shop: An Automation Tool for Fair Price Shop under the Public Distribution System" [6],this paper proposes the use of ICT to avoid leakages in delivery system and successful application in atomization of supply chain.

III. PROPOSED METHODOLOGY

A.Distribution station

The block diagram of a Real Time monitoring and logging of Ration system with QR code scanner is shown in the Fig.1 this system consists of various parts such as GSM, LPC2148 ARM7 microcontroller, mechanical assembley, liquid pumps ,LCD, load cell and android Application for scanning and .net application.

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The Features of the proposed system are

- Highest Security since Aadhar Card Based System
- Very reliable system
- Unique ID for each user
- Easy to maintain database of various ration cards eg below poverty line, white ration card etc.
- Easy inclusion & removal of user in the database.
- Powerful GUI

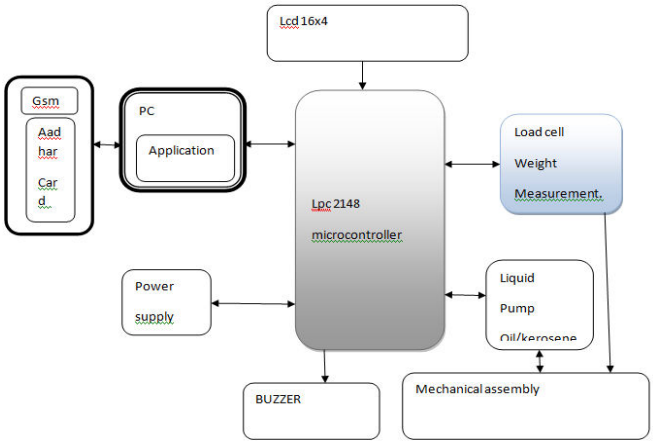

Fig 1.Block Diagram. Of a Real Time monitoring and logging of Ration system with QR code scanner.

It is the PC application developed in VB to update the Agency stock at each transaction of grains delivered.,which will substract the amount of grains data given to custmer each time and this information is recived through the SMS sent via GSM module.It has customer name,Quantity,grain type and status buttons on it.it can add user or remove also.we can show the next issue date as well.Meanwhile this process can be logged as well,to keep real time tracking of data distribution to avoid adultration and mal practice of the stock.this will achive the greater involvemt of government as this will be stored at Government site,where in officer can monitor individuals agency wise progress.

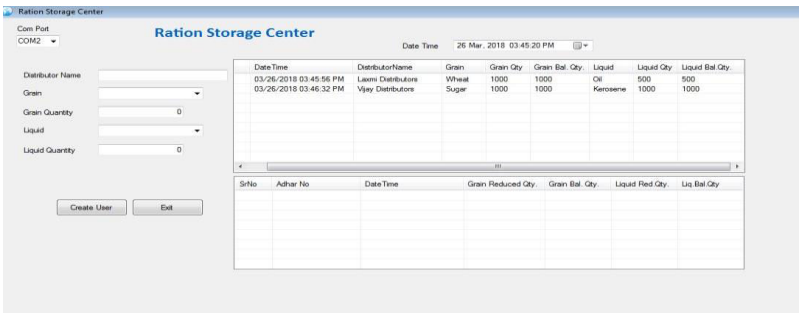

Fig 2.Pc based application

B. Mobile Application for Scanning QR Code

This is the mobile based application developed in android system which on pressing the scan key it will automatically open the mobile camera and scan the QR code printed on AADHAR card. it will fetch the AADHAR no and customer name. will send this message to controller for further processing.

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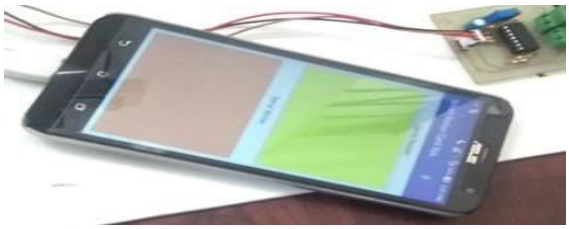

Fig 3. Mobile Application for Scanning QR Code

IV. HARDWARE DESCRIPTION

A. Power Supply Circuit Diagram

PSU is an important and essential part of very many items of electronics equipment. Any electronic equipment moreover based on power supply. It has to supply the exact or near exact voltage at the required wattage to all of the circuitry inside the system.

The processor/controller and memory are particularly sensitive part and require an exact supply or as near as possible to one. The A.C. mains power supply is 230v and 50Hz, commonly it takes A.C. power from mains supply and delivers a dc voltage to the item requiring power. power supplies are widely used in a variety of forms - some large supplying high levels of current, other power supplies, much smaller providing lower levels of

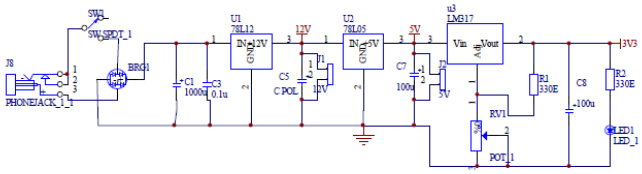

Fig 4 : Power Supply

The power supply is most important for electronic circuits, which provide the essential power to microcontroller and other electronics devices. The power supply circuit diagram is shown in the Fig. 4.

B. Microcontroller unit

Microcontroller LPC2148, programming of this microcontroller is very easy. It is used to interface with all interfaces as per our requirement.

- Watchdog timer,PWM unit, and 32bit two timers
- 60 MHz, CPU clock , On-chip crystal oscillator and On-chip PLL.
- 128 bit wide interface enables high speed 60MHz operation
- ARM 7 TDMI core of 32 bit capacity
- Two IO ports for peripheral, more input output pins, so more scope for peripherals.
- 14 channel built in 10 bit ADC
- Static RAM on chip is 32Kb
- Flash ROM with ISP and IAP is 512Kb
- Interrupt controller is vectored

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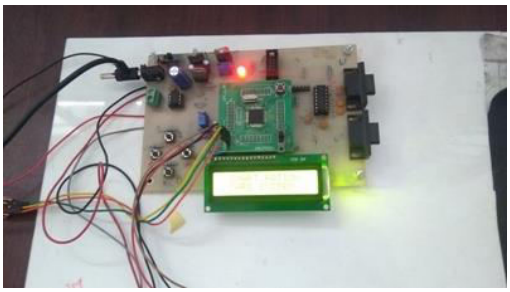

Fig 5: Microcontroller Circuit

C. Communication Protocol RS 232

RS-232 is a standard communication protocol for linking computer and its peripheral devices to allow serial data exchange. In simple terms RS232 defines the voltage for the path used for data exchange between the devices. The RS-232 standard is commonly used in computer serial ports. The standard defines the electrical characteristics and timing of signals, the meaning of signals, and the physical size and pinout of connectors.So it is a media used to communicate between microcontroller and the PC

D. Load Cell for Grain Measurement

The gauges are bonded onto a beam or structural member that deforms when weight is applied, in turn deforming the strain-gauge. As the strain gauge is deformed, it's electrical resistance changes in proportion to the load. By matching the expansion rate of the strain gauge to the expansion rate of the metal it's mounted on, undue strain on the gauges can be avoided as the load cell warms up and cools down. The most important method of temperature compensation involves using multiple strain gauges, which all respond to the change in temperature with the same change in resistance. Some load cell designs use gauges which are never subjected to any force, but only serve to counterbalance the temperature effects on the gauges that measuring force. Most designs use 4 strain gauges, some in compression, some under tension, which maximizes the sensitivity of the load cell, and automatically cancels the effect of temperature. Strain-gauge load cells convert the load acting on them into electrical signals. The measuring is done with very small resistor patterns called strain gauges - effectively small, flexible circuit boards.

Fig.6 load cell

E. SIM800GSM Module

GSM module is provided by SIM800 module, uses the mobile service provider and sends SMS to the respective authorities .as per programmed instructions. GSM (Global System for Mobile communication) is a digital mobile telephony system. With the help of GSM module interfaced, We can send the grains quantity that need to be updated at government side ,this sms will be comprising the details of customer and his purchased value and that amount is subtracted from Ration Storage utility.There are no specified range limits. GSM uses a variation of time division multiple access (TDMA) and is widely used of the three digital wireless telephony technologies (TDMA, GSM, and CDMA). GSM digitizes and compresses data, then sends it down a channel with two other streams of user data, each in its own time slot. Operates at either the 900 MHz or 1800 MHz frequency band. he GSM modem communicates with any MCU through its serial port. For connecting to internet we can use GPRS mode. We can access sim with AT commands for sms and call services.

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Fig 7.GSM SIM800

V. SOFTWARE IMPLEMENTATION

Required software for the system is development is in embedded c using Keil, then code is compiled and embedded in LPC2148. Following is the algorithm sequence to be executed for our system.

ALGORITHM:

1. Power ON
2. Peripheral initialization
3. Sensor initialization
4. Mobile connection through OTG
5. Press scan key
6. Scan QR code.
7. Send information from mobile to controller
8. Display customer details on display
9. Control system converts A to D value getting Weight
10. Display the weight given.
11. Start pump for oil or kerosene.
12. Press weighing done key
13. Press SMS key for message sending command from controller to mobile
14. Send message
15. Update ration storage utility using received message Command via GSM at PC
16. Log the data of transaction.
17. Stop

VI. HARDWARE IMPLEMENTATION

In the hardware implementation part we have power supply design, key interfacing with the controller, buzzer interfacing and besides that RS232 for communication purpose with two UART terminal for data transfer and connectivity. Figure 8 below depicts the circuit diagram of the research work.

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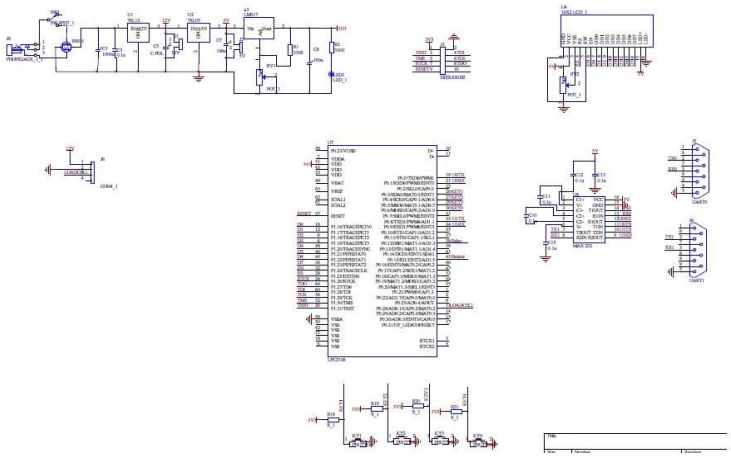

Fig 8.Circuit Diagram

Protel 98 PCB design tool is used for circuit diagram design and layout making. In this we get the actual layout layers required to print the board. We can manually design the component and connections as per our circuit diagram and the tool will give us the top layers view, base board drawing, and pcb layout in the pdf formats among which we need the layout layer for pcb printing. Figure 9 below depicts the PCB layout for Real time ration system.

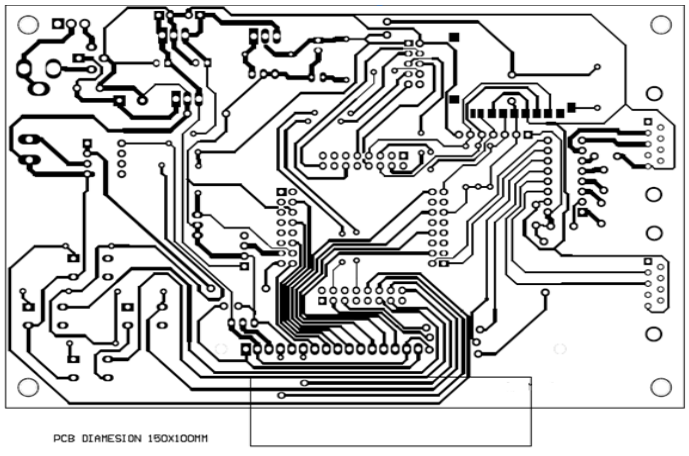

Fig 9.PCB layout

VII.FLOW CHART

Our system has the following sequence of steps in which the process runs. We will pictorially represent the in the form of flow chart.Figure10 and figure 11 depicts the transmitter and receiver side flow charts respectively.

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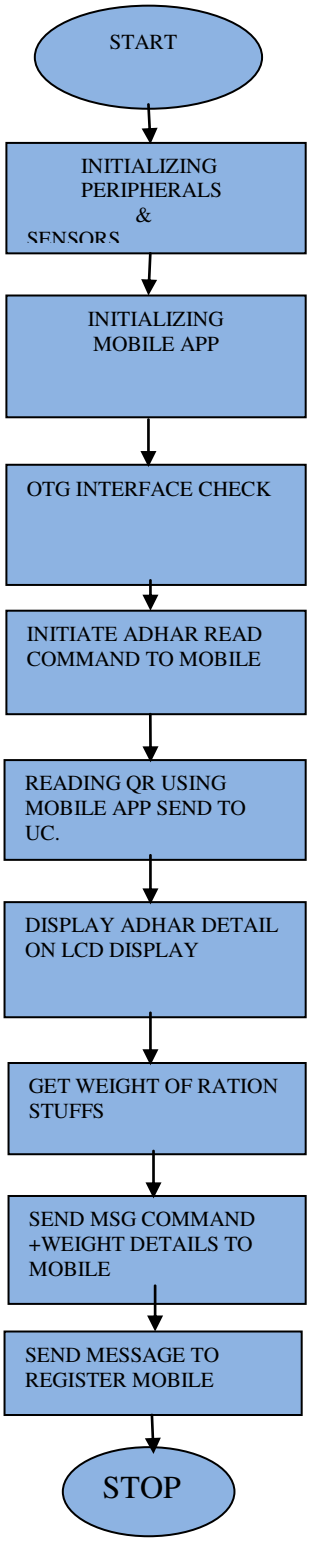

Fig10.trasmitter flow chart

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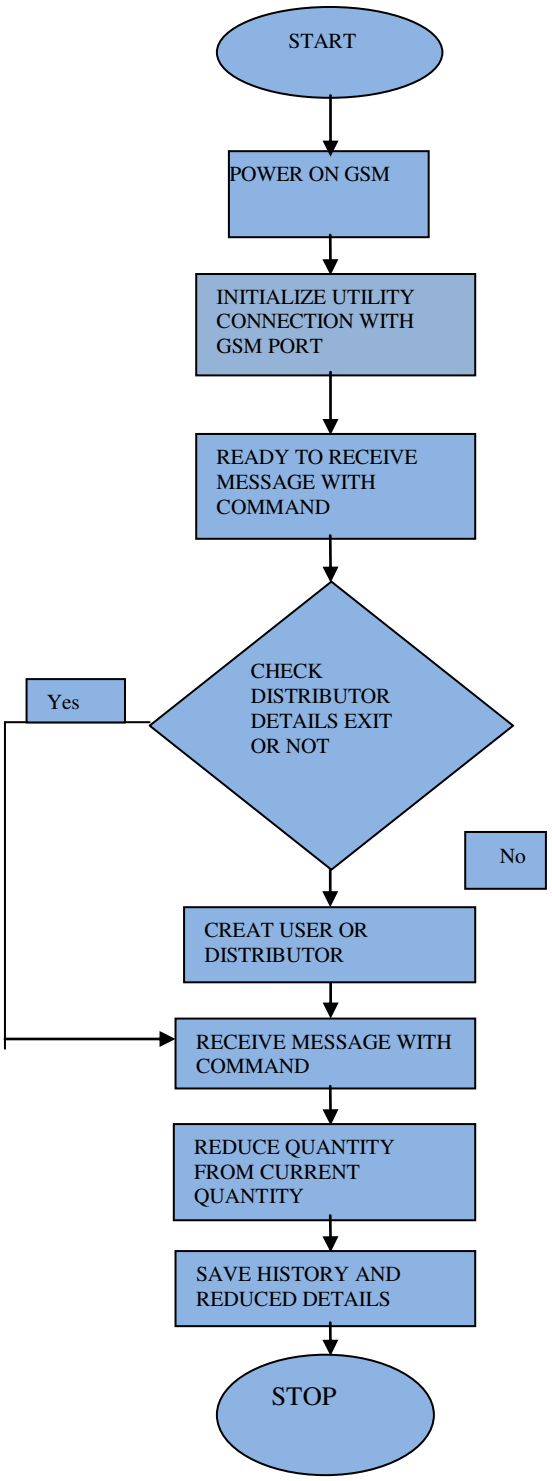

Fig11Receiver flow chart

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VIII. RESULT AND DISCUSSION

In this section we will discuss about the results of our proposed system. This system is designed for monitoring and logging of different transactions of customers availing the subsidized grains at fair price shops , PDS and Cheap Ration Systems. So here Distributors from remote location are monitored using GSM technology as shown in Fig All the time we can monitor current status of our system with the dedicated Ration Storage Utility. Here it is possible to save data in text form, which is saved in the PC for later reference. From this we can track the distribution process where we are logging the customer adhar id, and his taken ration quota, time of distribution and every time remaining balance with particular distributor. Since we are using the Adhar no to be recorded in database, Authenticity is maintained and as government is trying to maximise the scope of adhar identity to every possible sector to make life easier, we are at advantage. Fig 12 shows the interfaced system.

Fig12.LPC2148 with SIM800 interfaced with peripheral devices

We are using the android application on mobile phone to scan the QR code on AADHAR card, we need to decode the data and send this over the communication channel. we have serial reader and writer developed for the same purpose. Fig 13 shows the results of data being scanned,decoded,and sent over to receiver.

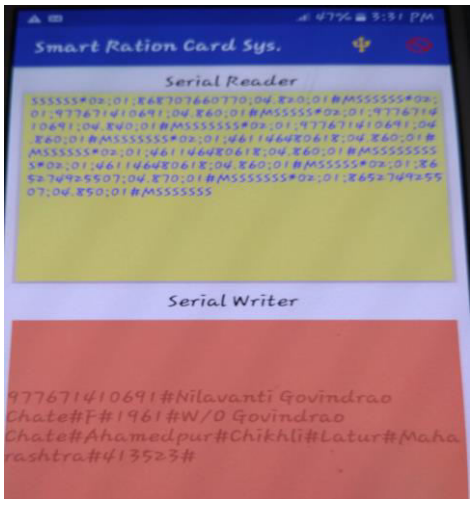

Fig 13 Aadhar name and id read by QR code Scanner.

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PC application named ration storage utility has got the distributor details their monthly stock and balance stock for grains and oil quantity.Same time it has got advantage of saving the history of transactions along with storing the aadhar card numbers and their time and date of purchase.Fig 14 shows the results of ration storage utility.

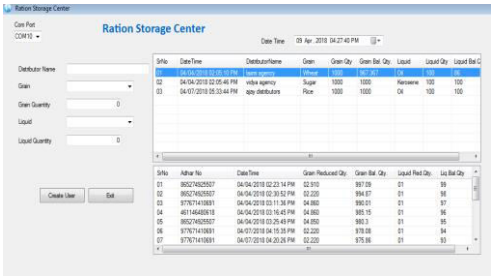

Fig.14 Ration Storage Utility showing distributor details and their logged data.

Ration storage utility showing new user addition ans saving into database is shown in fig15 below.

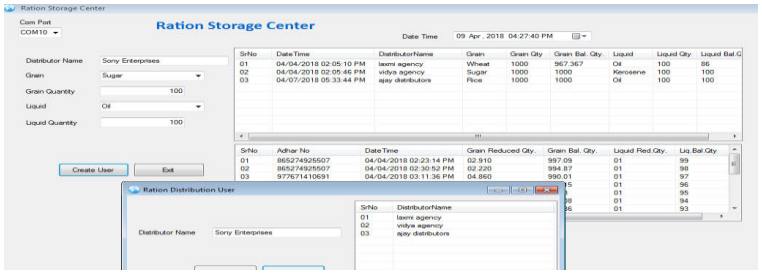

Fig 15 New user created in utility

Ration storage utility will create the two data log files that is one shown in fig16 named as User logged data.txt which shows all distributor data and another is fig 17 named User logged details .txt which shows the transactions of the all users details aadhar number,quantity of grains and liquid and the time and date of purchase.

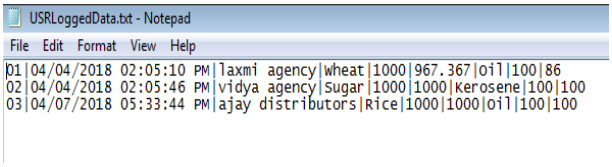

Fig16.User Logged Data.txt Showing all Distributor data.

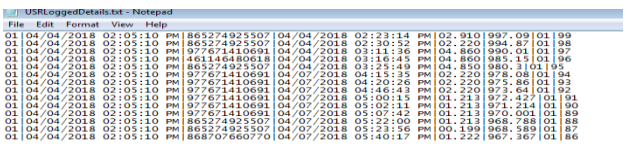

Fig17. User logged details.txt file showing all transactions data.

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IX. CONCLUSION

We have developed the system which enabled us to track the transactions. Through this system we can monitor the dealer for his every transaction, grains assigned and logging will be done same time. Also since we tried to interlock the system if it exceeds the allotted quota of user so malpracticing of favourers is tracked. Also denial of the grains stock availability will be reported at government end through Ration storage utility. User will only get his quota after the one month of the current purchase date. Thus the process has got multiple checks so as to avoid and minimize the corruption at maximum possible levels and make it user friendly to satisfy the needs of common people at large. Now a days aadhar card is compulsory everywhere so fake users can be tracked and original status can of user belonging which poverty category is also tracked. Its effective and in future we can use this database for other government schemes as well.

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