Secure Warehouse with Automatic Stock Calculation

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Abstract---Better Inventory management is the most difficult task in case of big warehouse/go-downs which may have hundreds or lacs of items stored in time. Sometimes it may also include valuable goods like costly mobiles, diamonds, laptops etc. so there may be a chance of theft. While due to number of items it is difficult to carry out stock calculation frequently and reliably as it is human driven process. Hence a system is required which calculates the number and type of items and that gets displayed on screen. It may also be displayed which item has been removed or stolen as soon as it goes away. Hence it also provides security. The system includes RFID transmitters which are to be mounted on each item. RFID transmitter transmits the unique code continuously and it is received by the RFID receiver. It decodes the unique code and generates the binary pattern which is given to the 8051 microcontroller. Microcontroller calculates which kind of stock it is and update its record and displays it on LCD. By this Automatic stock calculation it reduces human effort and error as well as it increases the speed and security of goods. For better security purpose GSM Modem and PIR sensor are used.

I. INTRODUCTION

It is the most difficult task in case of big warehouse/go-downs which may have hundreds or lacs of items stored in time for better inventory management. . Sometimes it may also include valuable goods like costly mobiles, diamonds, laptops etc. so there may be a chance of theft. While due to number of items it is difficult to carry out stock calculation frequently and reliably as it is human driven process. Hence a system is required which calculates the number and type of items and that gets displayed on screen. It may also be displayed which item has been removed or stolen as soon as it goes away. Hence it also provides security. The system includes RFID transmitters which are to be mounted on each item. RFID transmitter transmits the unique code continuously and it is received by the RFID receiver. It decodes the unique code and generates the binary pattern which is given to the 8051 microcontroller. Microcontroller calculates which kind of stock it is and update its record and displays it on LCD. By this Automatic stock calculation it reduces human effort and error as well as it increases the speed and security of goods. For better security purpose GSM Modem and PIR sensor are used.

The main concept behind the project is receiving the sent SMS and processing it further as required to perform several operations. The type of the operation to be performed depends on the nature of the SMS sent. The principle in which the project is based is fairly simple. First, the sent SMS is stored and polled from the receiver mobile station and then the required control signal is generated and sent to the PLC that we have designed according to the command received in form of the sent message.

We have selected SIM 300 GSM module for our project. The messages are sent from the mobile set that contain commands in written form which are then processed accordingly to perform the required task. We also used PIR sensor as motion detector for providing security.

II. OPERATION

RFID transmitter transmits the unique code continuously and it is received by the RFID receiver. It decodes the unique code and generates the binary pattern which is given to the 8051 microcontroller. Microcontroller calculates which kind of stock it is and update its record and displays it on LCD. The encoders begin a 4-word transmission cycle upon receipt of a transmission enable this cycle will repeat itself as long as the transmission enable is held low. Once the transmission enable returns high the encoder output completes its final cycle and then stops. The decoders receive data that are transmitted by an encoder and interpret the first N bits of code period as addresses and the last 12N bits as data, where N is the address code number. A signal on the DIN pin activates the oscillator which in turn decodes the incoming address and data. The decoders will then check the received address three times continuously. If the received address codes all match the contents of the decoders local address, the 12N bits of data are decoded to activate the output pins and the VT pin is set high to indicate a valid transmission.

When the command is passed from transmitter to receiver then first of all the screen of LCD is cleared. Then the transmitter sends the code to the microcontroller and the calculation of the stock begins and the same command is displayed on the LCD. The codes on the transmitter and receivers side are matched. If the code is there then the exists message is displayed Or else the missing message gets displayed on LCD through microcontroller(in this case take it as Tag 1). The same process is repeated for all the codes stored in transmitter side. If the code gets matched to the receiver's side then the microcontroller understands that the goods is present(in this case lets take it tag 2) and it is displayed on the LCD. If any certain code is not matched on the receivers side then the missing message gets displayed on LCD and the buzzer goes on. Afterwards the stock calculation is done and result is displayed.

III. REQUIREMENTS OF THE SYSTEM

1) The system will have the ability to calculate stock automatically.
2) The PIR sensor will be detect motion and will be able to give message to the microcontroller.
3) The GSM modem will be give SMS for long distance and act like a mobile system.

4) If any motion is detected, the relay opens, triggering the alarm and hence security is provided*.*

IV. METHODS

RFID transmitter transmits the unique code continuously and it is received by the RFID receiver.It decodes the unique code and generates the binary pattern which is given to the 8051 microcontroller. Microcontroller calculates which kind of stock it is and update its record and displays it on LCD. PIR sensor and GSM modem are connected to the microcontroller.PIR sensor detect motion of human presence or absence and give message to the microcontroller. The PIR sensor will be detect motion and will be able to give message to the microcontroller. The GSM modem will be give SMS for long distance and act like a mobile system. If any motion is detected, the relay opens, triggering the alarm and hence security is provided. This project is calculated stock automatically and reduces human effort and error as well as it increases the speed and provides security of valuable goods.
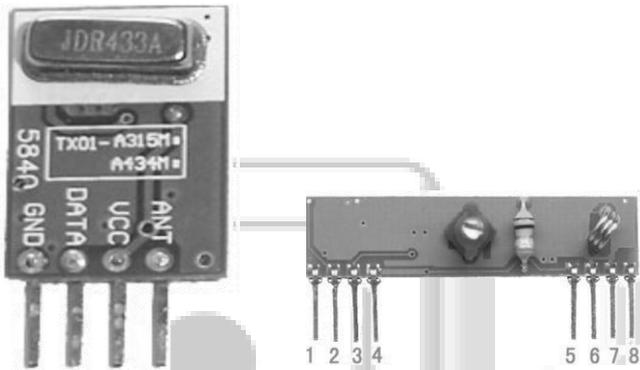

Fig. 1: RFID transmitter   Fig. 2: RFID receiver
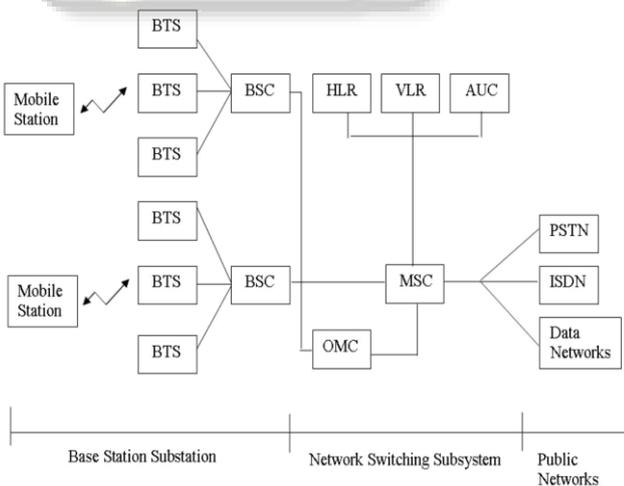
A. Gsm Architecture

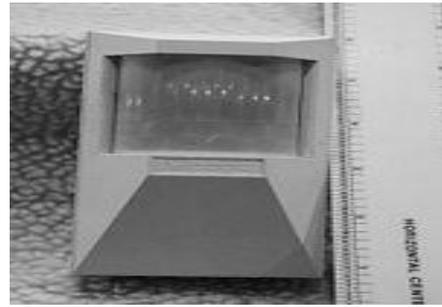Fig. 3: GSM architecture

B. PIR SENSER

Fig. 4: PIR sensor

The software change needs an application to accept the data sent through the sensing unit and display the same on LCD when that application is launched.
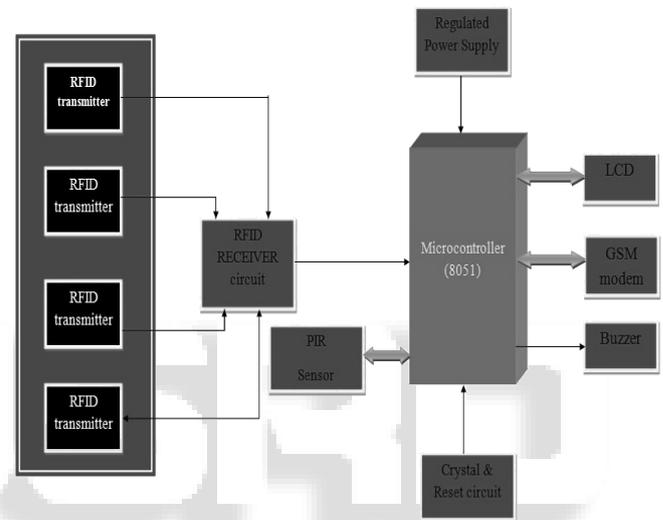
V. BLOCK DIAGRAM OF THE PROJECT

Fig. 5: Block Diagram

VI. RESULTS

For practical implementation of this project four RFID tags were used along with the microcontroller board. Microcontroller received code from each RFID Tag in every 1sec duration and it displays the status on LCD. In case of a stolen or missing product that particular tag's code want be received by the microcontroller at that time controller buzzes alarm and indicates on LCD which is shown in figure below.
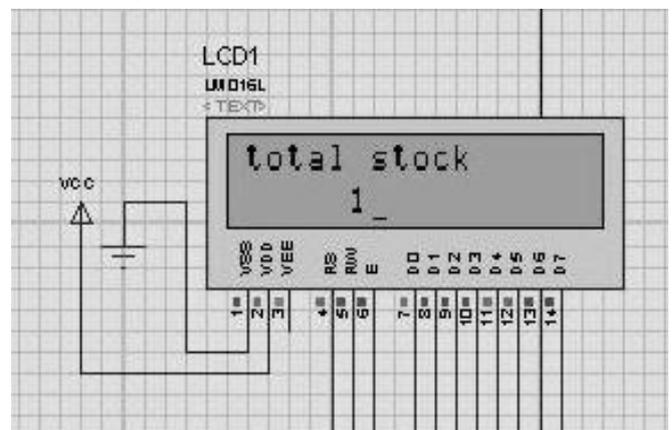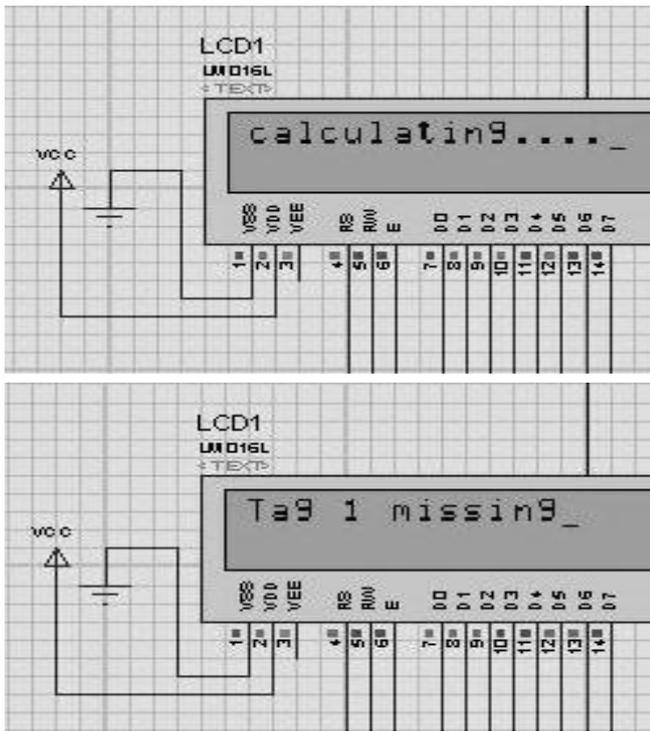
Fig. 6: Results display on LCD

At the same time SMS will also be sent to specific number. For security we have place PIR sensor to detect any unusual movement during the unofficial time.

VII. CONCLUSION

Automatic stock calculation reduces human effort and error as well as it increases the speed and security of valuable goods

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