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A Survey on Intelligent Defense Security System for ARMOR

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ABSTRACT: Technology is increasing rapidly in modern days. Security is primary concern for everyone. Biometric studies commonly include fingerprint, face, iris, voice, signature and hand geometry recognition and verification. Many other modalities are in various stages of development and assessment. Among these available biometric traits finger print proves to be one of the best traits providing good mismatch ratio. We can design multiple applications by integrating two different technologies viz. EMBEDDED SYSTEMS and BIOMETRICS. The conventional methods involve entering trainee details like officer Id, rifle Id in register book. These methods generally require long amount of time for registering trainee details and provide less security for rifles. In order to overcome these problems, an intelligent defense security system for armory has been implemented in this project. The proposed security system issues a rifle to trainee in army and collects rifle from him without entering his details in a book. Each rifle is tagged with an RFID tag for its identification and trainee can give electronic signature with the help of finger print technology. Alarm is generated in case of security breach. This project is built around ARM7 where we can achieve full level security that eliminates misusing of rifles with effective security algorithm.

KEYWORDS: Fingerprint, RFID (Radio frequency identification); RF reader; Passive tag; ISM Frequency.

I. INTRODUCTION

The motivation to our system is designed and implemented to save the time and reduce the man power. To draw and deposit the rifle in defense academy they are using older riffle drawing system where each officer needs to enter his details like officer Id, Riffle Id in register book to overcome this problem we developed this paper. In this system we are using finger print module, RF reader module and RF passive tag, 4X4 keypad, 16X2 LCD display. This project is built around ARM7. By this implementation, we can achieve full level of security that eliminates misusing of riffles which are electronically tagged can be eliminated.Main advantage of choosing this controller is, it consists of two Serial port interfacing capability, where RFID & Finger print modules interfaced to controller. A 4*4 matrix Keypad is used as an interface to controller. An EEPROM interfaced to controller for storing complete information for all the riffle tags using I2C protocol. To complete this paper successfully we have studied about finger print module SFG R303A, RFID reader module EM- 18 and passive RFID tags.

II. RFID TECHNOLOGY

Radio-frequency identification (RFID) is the wireless non-contact use of radio-frequency electromagnetic fields to transfer data, for the purposes of automatically identifying and tracking tags attached to objects. Some tags require no battery and are powered and read at short ranges via magnetic fields known as electromagnetic induction. Others use a local power source and emit radio waves (Electromagnetic radiation at radio frequencies). The tag contains electronically stored information which may be Tags may either be read-only, having a factory-assigned read from up to several meters away. Unlike a barcode, the tag does not need to be within line of sight of the reader and may be embedded in the tracked object. A radio-frequency identification system uses tags, or labels attached to the objects to be identified. The readers generally transmit their observations to a computer system running RFID software or RFID middleware. RFID systems typically come in three configurations. One is a Passive Reader Active Tag (PRAT) system that has a passive reader which only receives radio signals from active tags (battery operated, transmit only).

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The reception range of a PRAT system reader can be adjusted from 1-2,000 feet. There by allowing for great flexibility in applications such as asset protection and supervision. Another configuration is an Active Reader Passive Tag (ARPT) system that has an active reader, which transmits interrogator signals and also receives authentication replies from passive tags. Finally, there is the Active Reader Active Tag (ARAT) system in which active tags are awoken with an interrogator signal from the active reader. A variation of this system could also use a Battery Assisted Passive (BAP) tag which acts like a passive tag but has a small battery to power the tag's return reporting signal. RFID tags can be either 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. Instead, the tag uses the radio energy transmitted by the reader as its energy source. The interrogator must be close for RF field to be strong enough to transfer sufficient power to the tag. Since tags have individual serial numbers, the RFID system design can discriminate several tags that might be within the range of the RFID reader and read them simultaneously. serial number that is used as a key into a database, or may be read/write, where object-specific data can be written into the tag by the system user. Field programmable tags may be writing-once, read-multiple; "blank" tags may be written with an electronic product code by the user. The tag's information is stored electronically in anon-volatile memory. The RFID tag includes a small RF transmitter and receiver. An RFID reader transmits an encoded radio signal to interrogate the tag. The tag receives the message and responds with its identification information. This may be only a unique tag serial number, or may be product-related information such as a stock number, lot or batch number, production date, or other specific information. Fixed readers are set up to create a specific interrogation zone

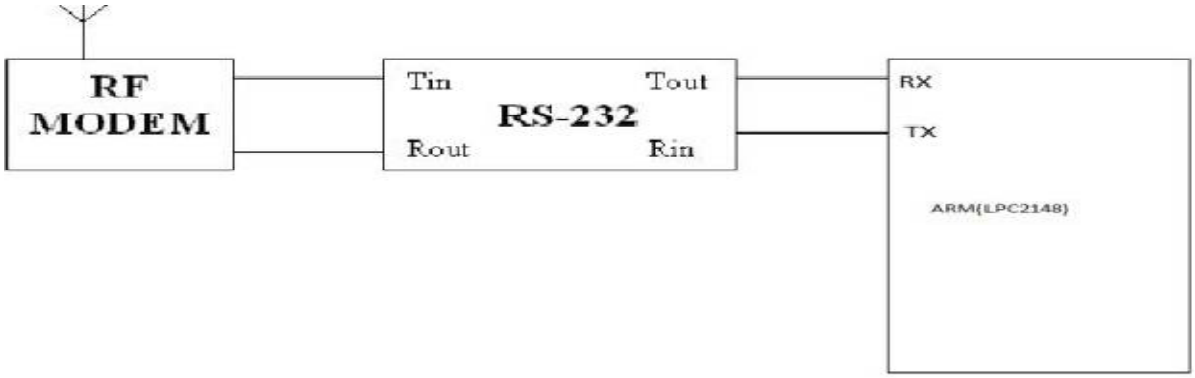

Fig 1: Interfacing RF module with controller

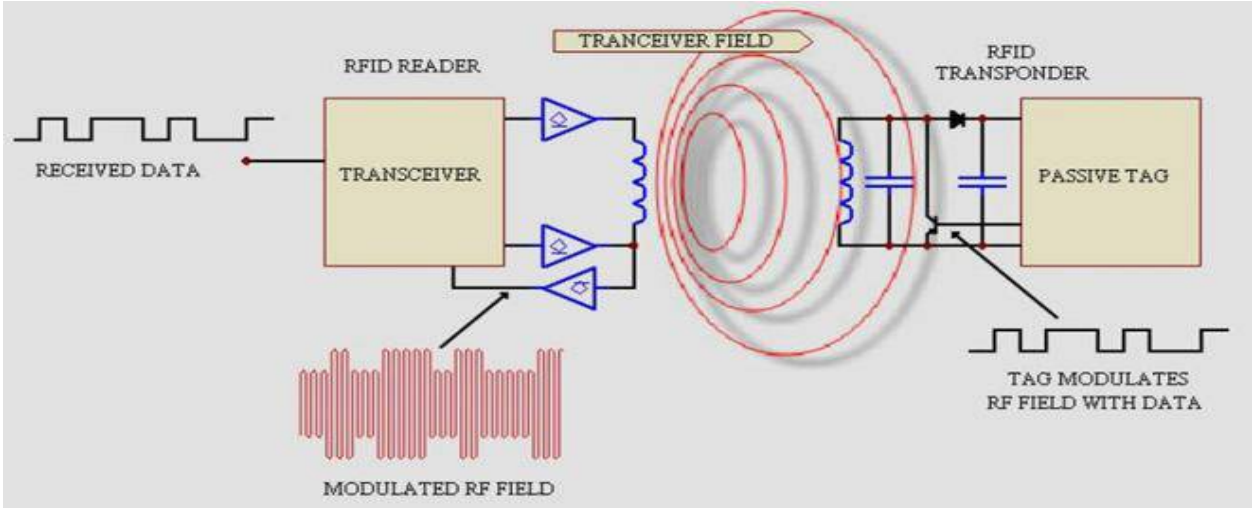

Fig 2: RFID Communication process

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Steps:
Host manages Reader(s) and issues Commands Reader and tag communicate via RF signal Carrier signal generated by the reader Carrier signal sent out through the antennas Carrier signal hits tag(s) Tag receives and modifies carrier signal

- "sends back" modulated signal (Passive Backscatter – also referred toas "field disturbance device")
- Antennas receive the modulated signal and send them to the Reader
- Reader decodes the data
- Results returned to the host application

which can be tightly controlled. This allows a highly defined reading area for when tags go in and out of the interrogation zone.

III. FINGER PRINT MODULE

The field of biometrics was formed and has since expanded on to many types of physical identification. Still, the human fingerprint remains a very common identifier and the biometric method of choice among law enforcement. These concepts of human identification have lead to the development of fingerprint scanners that serve to quickly identify individuals and assign access privileges. The basic point of these devices is also to examine the fingerprint data of an individual and compare it to a database of other fingerprints. Nearly everyone in the world is born with a fingerprint that is unique; a separate and comprehensively identifying attribute that sets us apart from the other 6.5 billon people that inhabit this world. It is because of this fact that the fingerprint has proven such a useful part of biometric security. The very reason that fingerprint scanners are useful can be found in this fact as well. However, this is far from the only reason they are used. Another important reason fingerprint scanners are used is, they provide a quick, easy, efficient, and secure measure through which, an individual with the proper access

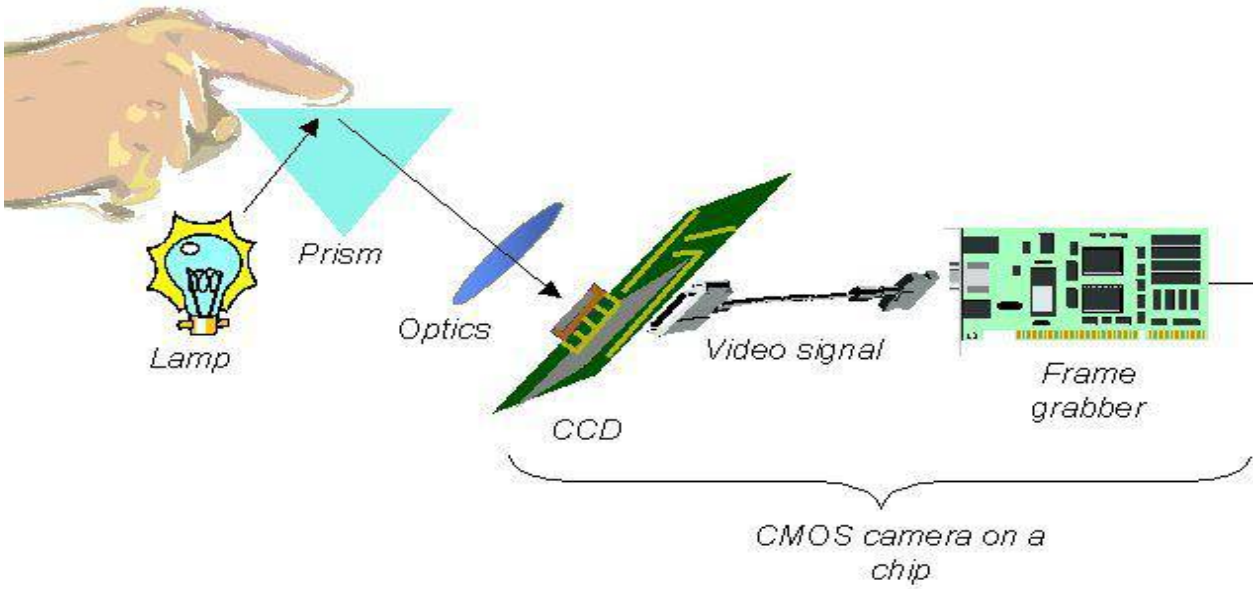

Figure 3: Finger print optical reader Reflection diagram.

Optical reader Reflection:
The oldest 'live-scan' readers use frustrated refraction over a glass prism (when the skin touches the glass, the light is not reflected but absorbed). The finger is illuminated from one side with a LED while the other side transmits the image through a lens to a camera. (FTIR: frustrated total internal reflection). In this paper we are using SFG R303A Fingerprint module, SFG R303A series is the fingerprint module for secondary development which has integrated fingerprint collecting and single chip processor together. It features small size, low power consumption, high reliability, small fingerprint template, etc. It is very convenient to be embedded to user system for realizing clients required finger

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print verification products. This proposed architecture operates in 4 different modes. First mode is enrollment mode (or) registration mode, in this mode we have to press '#' key in keypad it allows you to create 3 digit ID, then it will ask you to place finger on the surface of the fingerprint module after placing the finger place a RF tag (rifle) near by the RF reader and then the 3 digit will be allocated to both finger print and rifle (tag), here we are using 24C256 EEPROM for information storage, this will retains the contents of all registered riffles i.e., tag information in it. Second mode is matching mode, in this mode if the thumb fingerprint matches the RF tag, we can draw and deposit the rifle. Third mode is deletion mode in this mode we can delete the particular ID by pressing 'D' from the keypad and particular ID. Fourth mode is empty mode, in this mode we can delete all the ID's at a time by pressing '*' from the keypad then it deletes all the ID's from the system.

IV. PROPOSOED ARECHITECTURE

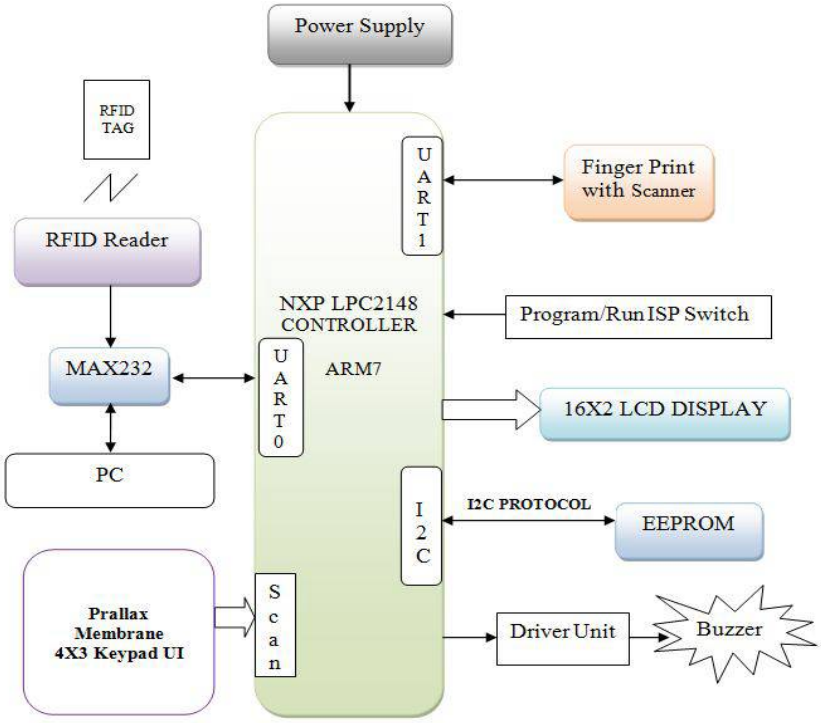

Figure 3: Block diagram of the system.

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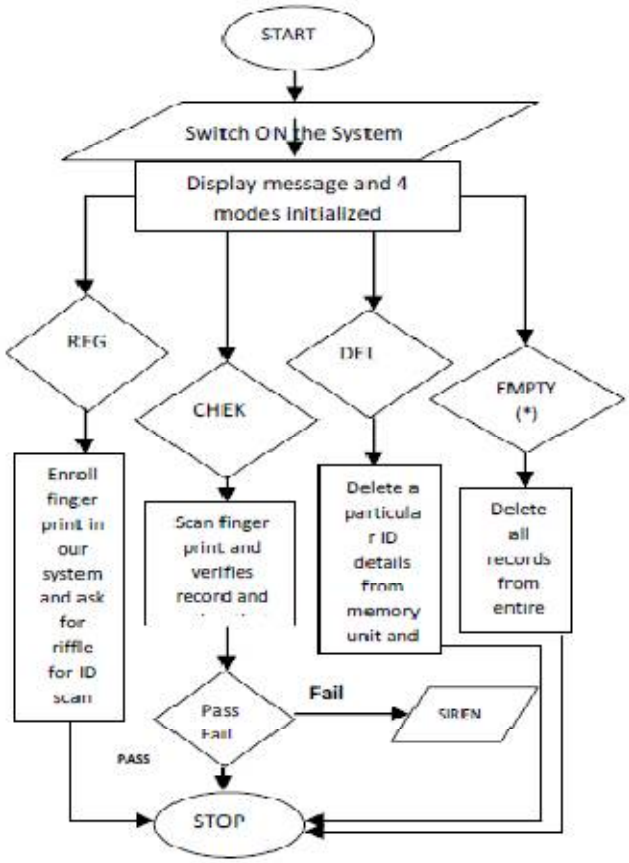
FLOWCHART



V.CONCLUSION

In this paper we have discussed about how to reduce the time consumption when drawing and depositing the rifle and also the security to the rifle and give the proposed architecture for this real time system using ARM, RFID and finger print modules.

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