

# RFID and IoT Based Electronic Passport Verification System

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**Abstract** - Electronic Passport is a digital version of a paper passport to provide strong identity authentication. Passport verification and checking time consuming process. The new passport became a much more confusing one than traditional, thus reducing the amount of human errors that could be easily checked, protect against the manipulation of travel documents, and thus improve border security issues. The proposed system simplifies this process by using a unique RFID card with unique identification number. Information includes name, nationality, address etc. Attach required certificates as well as application type required. Information is transferred to the computer with the help of the RF transmitter. It has an audio-visual indication and some of the other features of the door lock system. This proposed system uses Radio Frequency Identification (RFID) is a technology that uses wireless communication for identification purposes. The key characteristic that differentiates one RFID application from another is the purpose of identification. RFID utilization in passport verification system, by using Internet of Things (IoT) and Cloud technology, it will produce a real time passport monitoring system that can be accessed by various parties.

**Index Terms** - Electronic passport, border security, RFID, Internet of Things.

## 1.INTRODUCTION

An electronic passport (E-Passport) is an ID report which has related Biographic or biometric data of its conveyor. It is installed in Radio Frequency Identification chip (RFID Tag) which is practiced of cryptographic usefulness. The effective execution of biometric methods in archives, for example, E-Passports means to the quality of fringe security by diminishing the chance of duplicate or phony passport and making decisively of character of the reports' holder. The e-Passport likewise offers considerable

advantages to the legitimate holder by giving a more advanced methods for affirming that the passport has a place with that individual and that it is genuine, without imperiling protection.



Figure 1. Symbol of Electronic Passport Defined by ICAO

The states are as of now giving ePassports, which relates to over half of all passports being given around the world. This speaks to an extraordinary upgrade in public and worldwide security as it improves the honesty of passports by the need to coordinate the data contained in the chip to the one imprinted in the report and to the physical qualities of the holders; and empowers machine-helped check of biometric and biographic data to affirm the personality of voyagers. For Electronic passport there is a worldwide standard ICAO. ICAO represents International Civil Aviation Organization. The ICAO gives limit security norms or set of rules. Every nation observes this norm, yet the confirmation technique may contrast for various nations.

The inspiration of this task is to get to subtleties of a passport holder through RFID and cloud innovation. For this reason, the approved individual is given a RFID card. This card contains an incorporated circuit that is utilized for putting away, handling the data through tweaking and demodulating standards of the

radio frequency signal that sent. Consequently, the information put away in this card is alluded to as the passport subtleties of the individual.

## 2. PROPOSED ELECTRONIC PASSPORT SYSTEM

The main functionality of this project is to access the passport details of a passport holder through RFID and IoT technology. For this purpose, the authorized person is given an RFID card. This card contains an integrated circuit that is used for storing, processing information through modulating and demodulating of the radio frequency signal that is being transmitted. Thus, the data stored in this card is referred as the passport details of the person. The system architecture of the research work is shown in figure 1. In this the details of the person would be fed into the computer and a unique number is allocated to the person that number is printed of RFID tag. The RFID reader reads the details of the RFID passport and sends the data wirelessly with the help of IoT. On the other side the other RF receiver receives the details and sends to the microcontroller. Here, the controllers compare with the data already there. If it matches than the person is allowed, less he would be termed as a criminal by giving an alarm/buzzing signal.

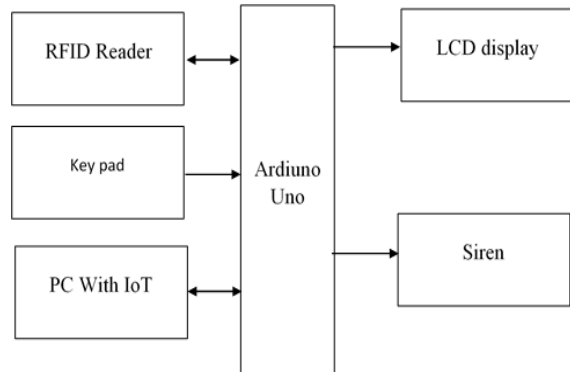


Figure 1 Block Diagram of Proposed System

This proposed system simplifies the process by giving the authorized person an RFID tag containing all the passport details like name, passport number and nationality etc. Once, the person places the card in front of the RFID card reader, it reads the data and verifies it with that data present in the system and if it matches then it displays the details of the passport holder. Here we use arduino uno controller. For display a 16X2 LCD is used. The LCD is used to display the basic messages such as —show tag, enter

your pin, password matched or —wrong password etc. The door control is used to lock the door whenever the user is not authentic. The regulated power supply is used to supply power for the whole circuit. Here the keypad is used to press the keys; here each user is assigned a password the keys are used to press the assigned password

### 2.1 HARDWARE AND SOFTWARE REQUIREMENTS

#### A. Hardware Requirement specification:

Ardiuno Uno  
Node MCU  
RFID Reader  
LCD display  
DC Motor

#### B. Software Requirement Specification:

Ardiuno software

### 2.2 Microcontroller

The controller used for this project is ATMEGA 32 processor. The processor performs following task such as receives data from RFID reader, conform the password of the each person which is given to him/her which is pressed with the help of keypad, perform all the necessary operations at the hardware circuitry such as giving messages to the LCD, send the data to the computer using the RF transceiver. Microcontroller acts as the most important component for the hardware circuitry. A program to control the necessary operation is fed into the microcontroller.

### 2.3 RFID tag and RFID Reader

RFID stands for Radio Frequency Identification Device. Here the person’s unique identification number is stored in a passive RFID card and a person is identified with the help of this card and this card can be read with the help of the reader and hence, the RFID technology is used to identify the particular user.

### 2.4 Computer

Computer stores the person ‘s information to cloud using Internet of Things and display it in the form of a visual basic application. It includes information such as name, address and the scanned copies of the digital photograph and other document such as driving license and Aadhar card.

### 3. RESULTS AND DISCUSSION

In this digital world, RFID technology is applied to many applications in different fields such as transportation, healthcare, industries etc. This technology along with Internet of things (IoT) facilitates wireless identification using active and passive tags with suitable readers. In this paper, RFID technology is applied for passport verification system to authenticate the passport holder. This avoids forgery and manual work associated with traditional passport verification system. The passport checker checks the passenger's passport by means of e-passport embed with RFID tag.

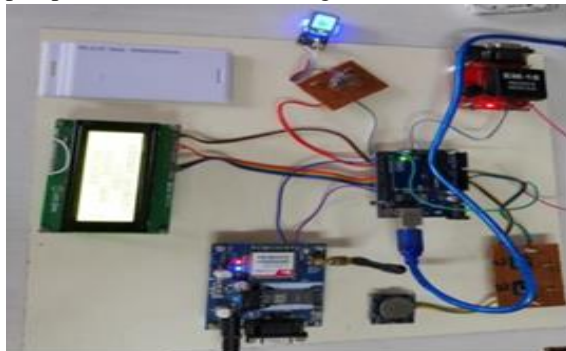


Figure 2 Hardware connections of E-passport verification system

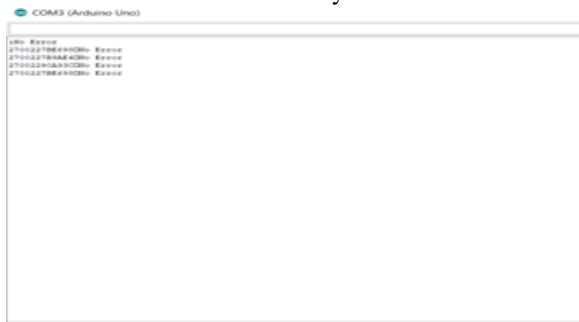


Figure 3 Simulation output of RFID reader and RFID

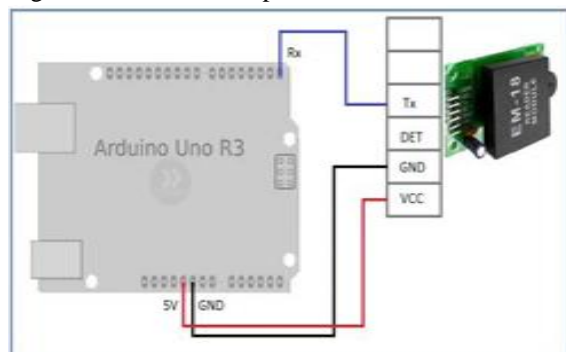


Figure 4 Connections between Arduino and RFID reader



Figure 5 Requisition for passenger to swipe passport embedded with RFID tag

Figure 2 shows the whole hardware connections of E-passport verification system. Figure. 3 shows the simulation results of RFID reader and Tag. Figure 4 shows the hardware connections of interfacing Arduino with RFID reader. Figure 5 show the hardware results of the requisition for the swiping of e-passport

### 4. CONCLUSION

In this digital world, RFID technology is applied to many applications in different fields such as transportation, healthcare, industries etc. This technology along with Internet of things (IoT) facilitates wireless identification using active and passive tags with suitable readers. In this paper, RFID technology is applied for passport verification system to authenticate the passport holder. This avoids forgery and manual work associated with traditional passport verification system. This system clearly shows that all the passport details will be electronically stored thereby reducing the risk of forgery, duplication of identity or identity theft, major problems which come with the conventional paper passport booklet. The system also proves that it is possible to constantly update the details of the cardholder in the system without any problems. The RFID cards as soon as they enter the electromagnetic field zone of the reader they are read without any hassles and in a split of a second the details of the card are displayed on the system monitor. Thus, the system saves time and provides enriched border control. For any RFID cards which will not have been stored in the system's database, these were not recognized by the system. If some will present any RFID cards to the

system, there is a guarantee that they will not be recognized by the system

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