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E-Passport Verification System

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Abstract: ***In this digital world, RFID technology is applied to many applications in different fields such as transportation, health-care, 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, fingerprint sensor and OTP through GSM. This e-passports are used in strengthening the security and helps the Airport authorities to identify the movement of order breakers or antisocial elements.***

Keywords **: *Arduino, Fingerprint sensor, GSM, RFID reader***

I. INTRODUCTION

Radio-frequency identification (RFID) uses the concept of electromagnetic fields to transfer data from an electronic tag, called RFID tag to uniquely identify an object, or person, which stores information electronically. Many literatures show that RFID technology has been implemented for smart attendance monitoring system, pricing in shopping mall, agriculture etc. Traditional styles of attendance include hand-written signatures, magnetic card etc. Ravali et al reported passport verification system using RFID and Arduino, which is capable of saving time involved in manual checking of paper passports and avoiding forgery[1]. Arulogun et al has proposed automatic attendance monitoring system in educational institutions and allocation of attendance scores for further managerial decisions [7]. Prashant Shende et al dealt with the implementation and design of Secure Electronic Passport system, which includes information such as the name, nationality and address[2]. Ahmed Raad et al dealt with the implementation of securing control to a smart building with the help of RFID tag[4]. Bhagya Wimalasiri et al described an E-Passport system with authentication in multi stages taking a case study of the security of Sri Lanka's E-Passport[3].

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They used RFID tags for person identification purpose and biometric technologies to reduce fraud and identity theft. Ramshida dealt with the dynamic control of traffic system using RFID and GSM[5]. Kanchan Warke et al has used RFID for smart ration card system[6].

The drawback of paper passports are that they do not have privacy and anyone can physically access or duplicate the passport. The present study helps the passport checker to automatically verify the passport of the passenger by means of E-passport verification system. When the RFID tag with passport holder is brought near the RFID reader, the data is read and displayed on the LCD. If the data matches with the data in the program memory, it displays a valid message. Otherwise, it will display invalid message. The fingerprint is kept to identity or to confirm the passenger details. Suppose the fingerprint is mismatched, the LCD will display invalid message. Once details are verified, the passenger will get the OTP in his registered Mobile number. After receiving the OTP number through GSM, the passenger will be allowed to enter into the airport for further processing.

II. METHODOLOGY

Fig. 1 depicts the block diagram of RFID based E passport verification system. It includes passive RFID tag, EM-18 RFID reader, Arduino Uno, Fingerprint sensor FIM3030HV, keypad, GSM and LCD.RFID reader consists of transmitter, receiver and antenna, which is interfaced with the micro controller. RFID tag is embedded in the passport of the passenger and RFID reader is fixed in the entrance of the airport to be monitored.

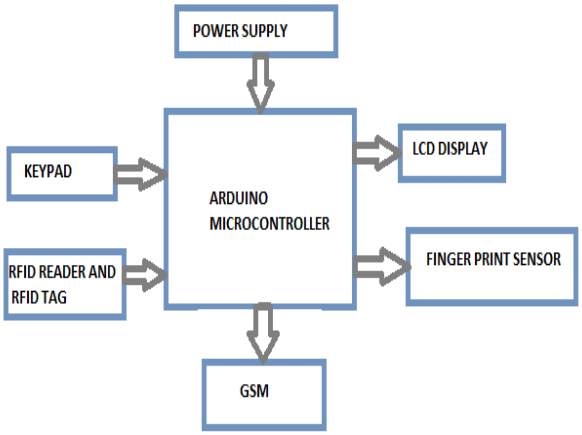

Fig. 1. Block diagram of E-passport verification system

When passenger swipes the RFID tag, the RFID reader reads the tag and sends the signal to Arduino. The Arduino identifies the ID of the passenger.

The fingerprint sensor and GSM module are used to identify and confirm the passenger's details allowing the passenger to proceed for further process.

III. RESULTS

Fig. 2 shows the whole hardware connections of E-passport verification system. Fig.3 and Fig.4 show the outputs of fingerprint sensor blink and enroll respectively. Fig. 5 shows the simulation results of RFID reader and Tag. Fig. 6 shows the hardware connections of interfacing Arduino with RFID reader. Fig.7 and Fig. 8 show the hardware results of the requisition for the swiping of e-passport followed by the GSM output of OTP got through registered mobile number.

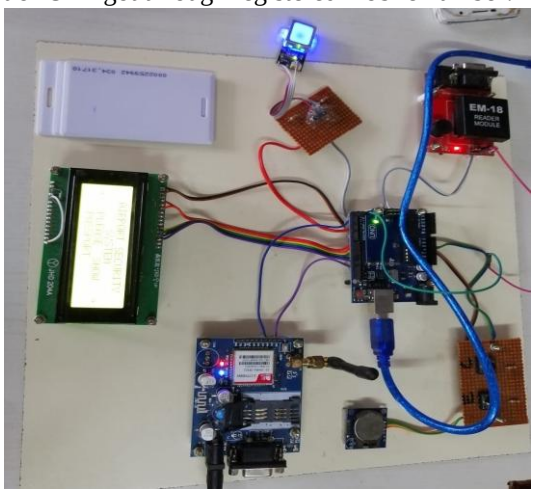

Fig. 2. Hardware connections of E-passport verification system

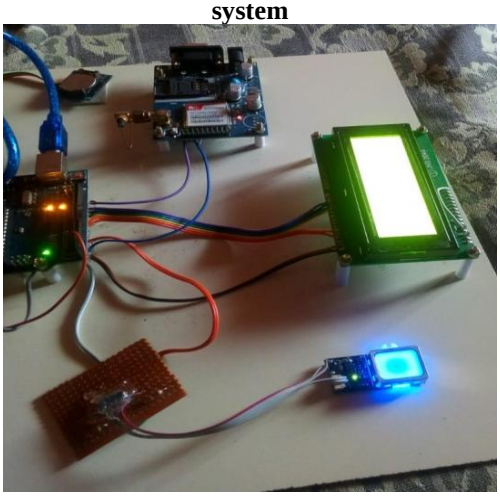

Fig. 3 (a).Hardware setup with Fingerprint sensor

Fig. 3(b). Simulation output for fingerprint sensor-blink

Fig. 4 . Simulation output for fingerprint sensor-enroll

Fig. 5 . Simulation output of RFID reader and RFID tag

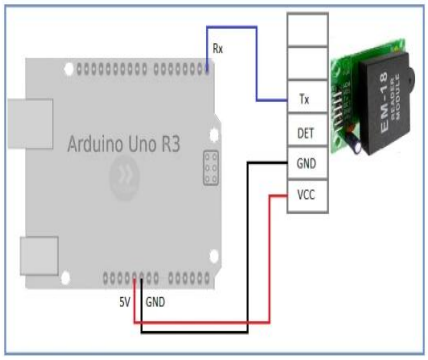

Fig. 6 . Connections between Arduino and RFID reader

Fig. 7. Requisition for passenger to swipe passport embedded with RFID tag

Fig. 8 . OTP sent through GSM to the registered mobile number

IV. CONCLUSION

In this paper, the manual checking of passport is replaced by an automatic system, which uses RFID technology and Arduino for authenticating a passport holder. This system makes it easy to monitor the passengers in an airport and also it reduces manpower and forgery. When the RFID tag is kept near the RFID reader, the data is read and compared with the data in the program memory. Once it matches, fingerprint sensor is used to identify the passenger's fingerprint. If the fingerprint is matched, valid message will be displayed. If not, invalid message will be displayed. This work can be further enhanced with the help of Iris identification and biometrics of the passenger.

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