

E-Passport Using RFID and Biometric

Ms. Aatmaja Dhanapune¹ Ms. Sakshi Ghotekar² Ms. Payal Kharat³ Ms. Aastha Barphe⁴
Mrs. R.V.Shinde⁵

^{1,2,3,4,5}Department of Information Technology

^{1,2,3,4,5}MVP's Rajarshi Shahu Maharaj Polytechnic, Gangapur Road, Nashik, Maharashtra, India

Abstract — Advancements in technology have created the chance of larger assurance of correct travel document possession, however, some issues relating to security and effectiveness stay unaddressed. Electronic passports have notable a good and quick readying all around the world since the International Civil Aviation Organization the globe have adopted standards where by passports will store biometric identifiers. This paper analyses the fingerprint biometric-passport style. This paper concentrate on the privacy and private security of bearers of e-passports, the particular security profit countries obtained by the introduction of e-passports victimization fingerprint recognition systems.

Keywords: RFID Tag, RFID Reader, E-Passport

I. INTRODUCTION

The employment of life science for identification has the potential to create the lives easier, and therefore the world folks board a safer place. The aim of biometric with RFID Tag suggests that e-passports are to stop the misappropriated entry of a person into a selected country and limit the employment of counterfeit documents by a lot of correct identification of a person. This paper analyses the fingerprint biometric e- passport style. These papers concentrate on the privacy and private security of bearers of e-passports, the particular security profit countries obtained by the introduction of e-passports victimization fingerprint recognition systems. The research worker analyzed its main crypto graphical features; the fingerprint life science presently used with e-passports and regarded the encompassing procedures. Research worker- centered on vulnerabilities since anyone willing to bypass the system would select a constant approach. On the contrary, only wishing on them could create a risk that didn't exist with previous passports and border controls. The paper conjointly pro- videos a security analysis of the e-passport victimization fingerprint biometric with RFID tags that are supposed to produce improved security in protective biometric info of the e-passport bearer. An E-Passport is an ID document that possesses connected biometric data of its bearer. It's embedded in the RFID tag that is accomplished by crypto graphical practicality. The triple-crown implementation of biometric techniques in documents like E-Passports aims to the strength of border security by decreasing the chance of the document's holder. The e-passport additionally offers substantial edges to the rightful holder by providing a lot of refined suggests that of confirming that the passport belongs there to person which it's authentic, while not privacy. The states square measure presently supplying e-Passports, which corresponds to quite five-hundredths of all passports being issued worldwide. This represents an excellent sweetening in national and international security because it improves the integrity of passports by the one written within the document and to the physical characteristics of the holders, and permits

machine-assisted verification of biometric and account data to verify the identity of traveller

II. LITERATURE REVIEW

- 1) Vignesh et al. (2022) proposed an enhanced E-Passport system integrating secured IoT and wireless communication technology. They highlighted the vulnerabilities of existing E-Passport systems, including security risks and limited data storage capacity. The authors suggested a novel approach using IoT-enabled RFID tags and wireless communication protocols to ensure secure data transmission and storage. Their system utilizes advanced encryption methods and biometric authentication to prevent unauthorized access and identity theft. The proposed system aims to improve the efficiency and security of identity verification processes, enabling seamless and reliable travel experiences. This study contributes to the development of a more robust and secure E-Passport system, addressing the limitations of existing solutions.
- 2) Honade et al. (2022) presented a comprehensive study on the development of an electronic passport using RFID technology. They explored the benefits of integrating RFID in passports, including enhanced security, increased data storage capacity, and improved identity verification processes. The authors discussed the components of an RFID-enabled passport, including a microprocessor, memory, and antenna, and highlighted the use of encryption algorithms to ensure secure data storage and transmission. They also examined the advantages of RFID passports over traditional paper-based passports, such as reduced counterfeiting risks and faster processing times. The study provided a foundation for the development of a secure and efficient electronic passport system using RFID technology, emphasizing its potential to revolutionize international travel and border control processes.
- 3) Kumar and Srinivasan (2021) introduced a biometric passport validation scheme utilizing radio frequency identification (RFID) technology. The proposed system integrates RFID tags with biometric data, such as fingerprints, to enhance the security and authenticity of passport verification. The authors employed a cryptographic algorithm to ensure secure data storage and transmission, preventing unauthorized access and identity theft. The scheme enables real-time validation of biometric data, reducing the risk of counterfeiting and improving the efficiency of identity verification processes. The study demonstrated the effectiveness of combining RFID and biometric technologies for secure and reliable passport validation, offering a robust solution for international travel and border control applications.

III. PROPOSED SYSTEM

The proposed work involves the design and development of an E-Passport system utilizing RFID and biometric technologies to enhance identity verification processes. The system consists of an RFID-enabled passport booklet containing a secure RFID tag, which stores the holder's biometric data (fingerprint or facial recognition) and travel information. Upon presentation of the passport at a border control point, an RFID reader is used to wirelessly read the data stored on the RFID tag. The biometric data is then compared with the individual's live biometric scan, performed using a biometric sensor (fingerprint reader or facial recognition camera), to verify their identity. The system ensures secure data storage and encryption, and compliance with international standards and regulations. The RFID reader and biometric sensor are integrated into a user-friendly interface for border control officials, streamlining the identity verification process and reducing processing times. This innovative solution enhances security, efficiency, and accuracy in identity verification, while providing a seamless travel experience.

IV. EXISTING SYSTEM

The existing E-Passport system utilizes a combination of RFID and biometric technologies to enhance identity verification processes. The current system consists of a passport booklet containing a contactless RFID chip, which stores the holder's biographic and biometric data, such as fingerprints and facial recognition information. At border control points, RFID readers are used to wirelessly read the data stored on the RFID chip, and the biometric data is compared with the individual's live biometric scan to verify their identity. However, the existing system has limitations, including security vulnerabilities, data storage capacity constraints, and compatibility issues with international standards. Additionally, the current system lacks advanced features, such as real-time data updates, secure data encryption, and seamless integration with other identity verification systems. The existing system requires enhancement to address these limitations and ensure a more secure, efficient, and reliable identity verification process.

V. SYSTEM ARCHITECTURE

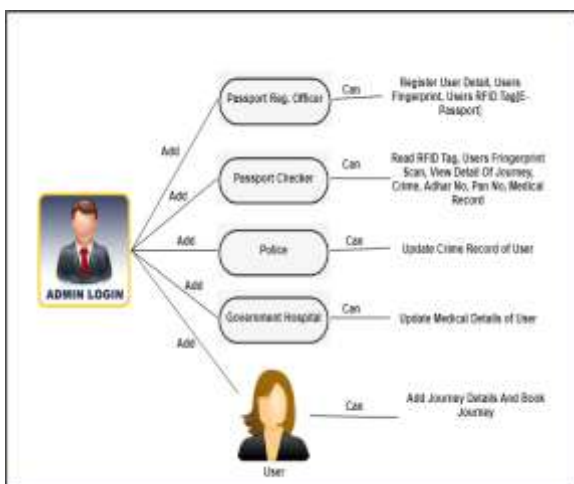


Fig. 1: System Architecture

The E-Passport system architecture comprises several components: RFID tags (E-Passports), RFID readers, biometric authentication (fingerprint scanning), and a secure database. The system operates as follows: the Admin (passport officer) registers user details, captures fingerprints, and assigns RFID tags (E-Passports) through the registration module. The RFID tags store user data, including biometric information and journey details. The passport checker uses an RFID reader to scan the RFID tag and authenticate the user's fingerprint, granting access to view journey details. The Police department and Government hospitals have separate modules to update user crime records and medical records, respectively. Users can access their journey details and book new journeys through a user portal. The system employs a secure database to store and manage user data, ensuring confidentiality and integrity. The architecture enables real-time verification, secure data storage, and authorized access, providing a robust and efficient E-Passport system.

VI. BLOCK DIAGRAM

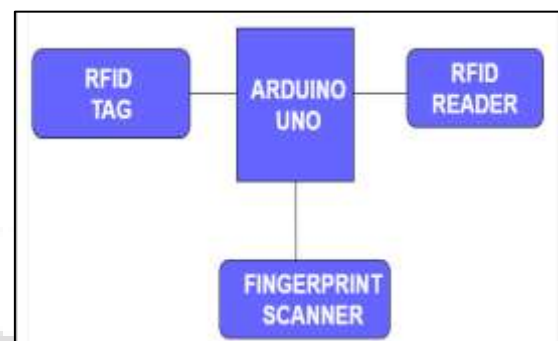


Fig. 2: Block diagram

- 1) **RFID System**: Basically RFID (Radio Frequency Identification) is a wireless link to uniquely identify objects or people. RFID enables identification from a distance without requiring line of sight. The RFID system comprises the RFID tag/card, RFID reader, backend database and a control unit. RFID systems have two broad categories passive and active. The RFID reader communicates with the RFID tag through tag interrogation.
- 2) **RFID Tags/Card**: RFID tags/cards consist of an Integrated circuit attached on an antenna that is printed, etched or stamped onto a base which is often a paper substrate of Polyethylene Terephthalate (PET). The inlay which is the combination of the chip and antenna is then inserted amid the printed label and its adhesive backing or it is either placed in a more durable structure.
- 3) **RFID Reader**: The RFID reader is also known as an interrogator, it provides the connection between the tag data and the software that needs the information.
- 4) **Biometrics**: Biometrics is the automated measurement of biological or behavioural features that identify a person. The major components of biometric system used in E-passport are:
 - 1) Capture
 - 2) Extract
 - 3) Create Template
 - 4) Compare

The fingerprint recognition technique is used to implement and realized this project.

VII. WORKING PRINCIPLE OF AN RFID BASED E-PASSPORT:

In the e-passport prototype this RFID system will enable details of a passport holder to be stored in a portable device called and RFID card. This RFID card will be read by an RFID reader and processed in order to identify the holder of this e-passport RFID tags are categorized as either active or passive. Active RFID tags are powered by an internal battery and are typically read/write, i.e., tag data can be rewritten and/or modified. An active tag's memory size varies according to application requirements; some systems operate with up to 1MB of memory Passive RFID tags operate without a separate external power source and obtain operating power generated from the reader. This project uses passive tags. Read-only tags are typically passive and are programmed with a unique set of data (usually 32 to 128 bits) that cannot be modified. The reader has three main functions: energizing, demodulating and decoding. The antenna emits radio signals to activate the tag and to read and write data to it.

VIII. MODULES

- 1) **ADMIN:**
 - Login.
 - Register
- 2) **PASSPORT OFFICE:**
 - Register User details.
 - User Fingerprint.
 - Users RFID Tag.
- 3) **PASSPORT CHECKER:**
 - Read RFID Tag.
 - Users Fingerprint Scan.
 - View Details of Journey, Crime, Adhar No.PAN No., Medical Records.
- 4) **POLICE:**
 - Update Crime Records of Users.
- **GOVERNEMENT HOSPITAL:**
 - Update Medical Records of Users.
- 5) **USER**
 - Add Journey details.
 - Book Journey.
 - Show Result.
- 1) **Passenger:** The passenger is required to obtain pre-travel authorization through the Electronic System for Travel Authorization (ESTA) to enter the USA under the Visa Waiver Program. The Secure Flight Program of the United States requires passengers to provide their Passport name, Date of birth and Gender.
- 2) **Officer:** The powers and duties of its Officers and employees. Duties are assigned to each Officer/official as per their designation at Passport Office (Main Office), Passport Seva Kendra (PSK) and Post Office Passport Seva Kendra (POPSKs).
- 3) **Administrator:** Administrator work is to assign passport and perform electronic passport system activity.
- 4) **E-passport center:** All Indian citizens who depart or intend to depart from India are required to be in

possession of a valid passport or travel document. Under the Passports Act 1967, the Government of India may issue different types of passports and travel documents such as Ordinary Passport, Diplomatic Passport, Official Passport, Emergency Certificate and Certificate of Identity for the purpose.

IX. ADVANTAGES

- 1) Helps to detect counterfeit or manipulated documents.
- 2) Confirms the identification of the individual.
- 3) The increasing threat of identity fraud requires a strengthening of security features in passports.
- 4) The use of biometric information to link a person to a passport can help to counter identify fraud.
- 5) Biometric verification can be used at border controls and to verify the image on a passport renewal application against images held on record.
- 6) No physical documents.

X. CONCLUSION

In conclusion, the integration of RFID and biometric technologies in E-Passports offers a robust solution for enhancing identity verification processes, ensuring secure, efficient, and reliable travel. The proposed system addresses the limitations of the existing system, providing advanced security features, increased data storage capacity, and seamless integration with international standards. By leveraging RFID and biometric technologies, the E-Passport system minimizes the risk of identity fraud, reduces processing times, and enhances the overall travel experience. As the world becomes increasingly interconnected, the adoption of E-Passports with RFID and biometric technologies is crucial for maintaining national security, facilitating international travel, and ensuring the integrity of identity documents. The successful implementation of this system has far-reaching implications for the future of identity verification, paving the way for a more secure, efficient, and globalized world.

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