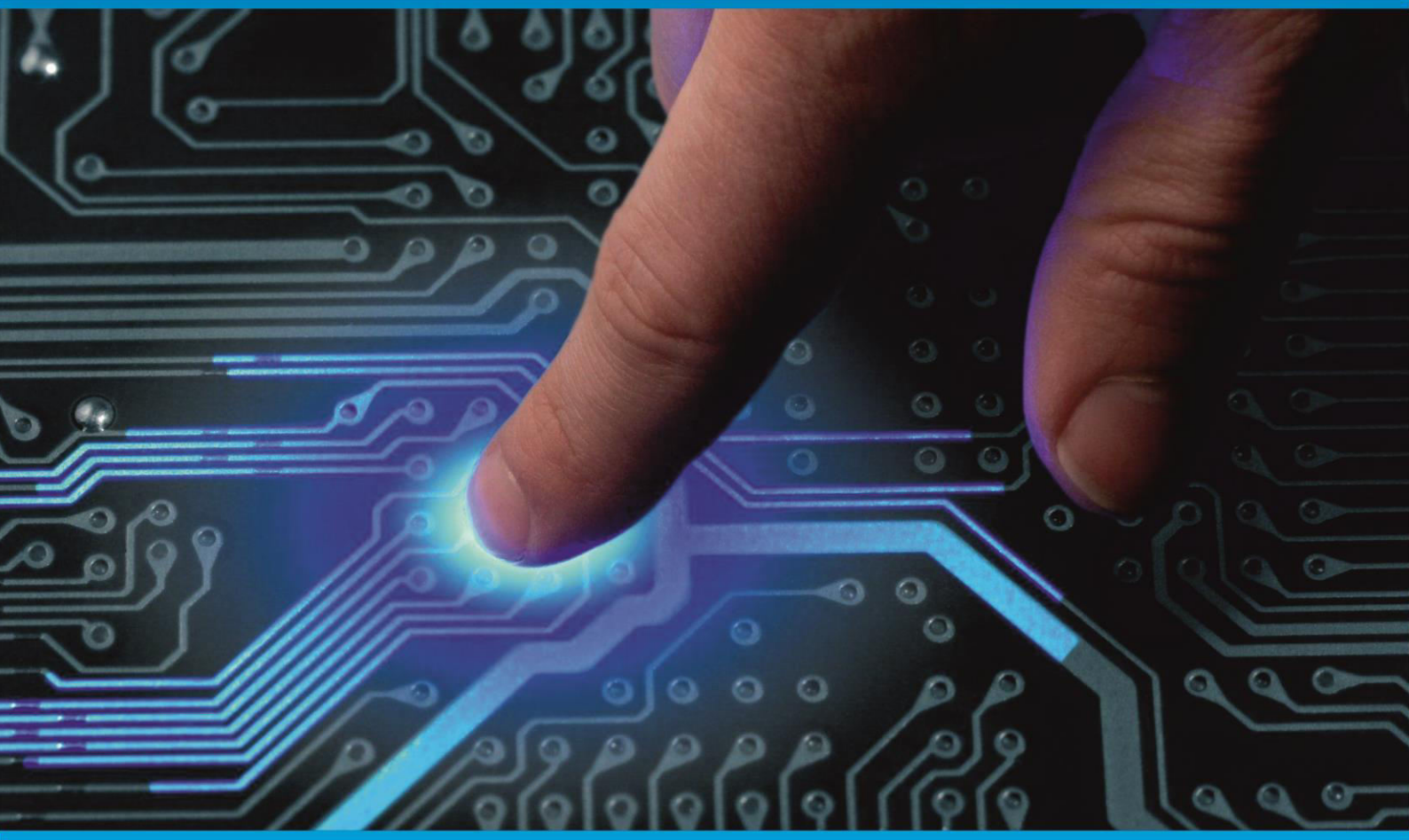
IJIRCCE

e-ISSN: 2320-9801 | p-ISSN: 2320-9798



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 9, Issue 2, February 2021

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 7.488

International Journal of Innovative Research in Computer and Communication Engineering

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 7.488 |

|| Volume 9, Issue 2, February 2021 ||

| DOI: 10.15680/IJIRCCE.2021.0902038 |

Smart Wireless E-Passport with Secured Communication Technology

Sivakumar.P[1], Vignesh.D[2], Vamsi Krishna Reddy.M[3] , Nishanth.D[4]

Professor Head, Department of ECE, GRT Institute of Engineering and Technology, Anna University, Tamilnadu, India[1]

U.G. Student, Department of ECE, GRT Institute of Engineering and Technology, Anna University, Tamilnadu, India [2,3,4.]

ABSTRACT: This dissertation analyses the use of wireless passports instead of the conventional paper passport booklet with an embedded chip. Advancement in technology comes with so many possibilities that all information can be stored electronically. This, in turn, will prevent illegal entry of the travellers into any specific country at the same time maintaining the privacy and personal security of the passport bearers. The foremost aim of this project is to have access to all the details of a passport holder by using smart card technology. A smart card is given to the authorized person who will own all the details required for passport verification. All the details through modulation and demodulation on the RF signal which will be transmitted by the reader. This makes the system centralized by increasing the security. With this propose system, people can reduce issues like passport lost and documents missing and also they can able to know the visa limit before expiring.

KEYWORDS: RFID Tags, IOT, E-passsport, Visa Intimation, web servers, Arduino uno , LCD Display.

I.INTRODUCTION

VISA is still largely paper based. The process to apply for a passport and other travel documents like VISA has many repetitive processes and require documents that need to be submitted multiple times for verification. In fact, in many cases applying for a different VISA to the same country also demands to follow the same process that was followed for earlier VISA.

People stand in long queues for getting their immigration checks completed due to paper based stamping process. There is always a huge hassle involved if the passport is lost or the data in the passport is incorrect or compromised. Generally, the problems people face for their travel is the long delays in getting their travel documents ready. The current process is inefficient, prone to errors and time consuming since it involves third party and paper-based verification done manually. Radio Frequency Identification (RFID) is an automatic identification technology via using Radio Frequency (RF) signals. Using RFID tag instead of passport and visa documents.to overcome the paper works and document missing issue.

Until recently, the travel documents such as a passport where just on paper possessing only the biographic information of the holder. However there has been a shift in technology such that biometric technologies may now be implemented in travel documents. When implemented in travel documents such as passports these are known as electronic passports (e-passports) aiming at strengthening security and reducing forgery. Secure and trusted travel documents are an essential part of international security, as they allow states and international institutions to identify the movement of undesired or dangerous persons.

The project is interested in finding out if the integration of RFID into passports will improve the robustness against identity theft by storing the information of the passport bearer electronically on an RFID card in the project prototype and identifying the e-passport holder. The implementation of the RFID e-passports might eventually replace the conventional paper passport and accelerate clearance through passport controls[1].

II. PROPOSED SYSTEM

The project is interested in finding out if the integration of RFID into passports will improve the robustness against identity theft by storing the information of the passport bearer electronically on an RFID card in the project prototype and identifying the e-passport holder. The implementation of the RFID e-passports might eventually replace the conventional paper passport and accelerate clearance through passport controls[4].

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 7.488 |

|| Volume 9, Issue 2, February 2021 ||

| DOI: 10.15680/IJIRCCE.2021.0902038 |

To overcome the difficulties faced in the previous method we have designed a Wireless passport system. This system uses smart card technology to avoid forgery and thus increases the security. This decreases the burden of documentation and thereby reduces the time consumption. Arduino Uno micro controller is used in this prototype system which will be responsible for storing the data and processing it by using modulation and demodulation of RF signal which is being transmitted by the reader.

The smart card will contain all the details required such as name, date of birth, nationality and UID number for the passport verification. When the person places the card into the card reader, the UID is read and then verified. If the card details matches with the centralized database, then it displays the details of the passport holder. In addition visa limitation details also can be known by this card. If the visa date is supposed to expire, the user will get an intimation and the user can request for visa date expansion to the respective passport office. The proposed design can be further be enhanced by adding biometric information such as palm scan, fingerprints, iris scan, digital signature and other active validation in the passport system [3].

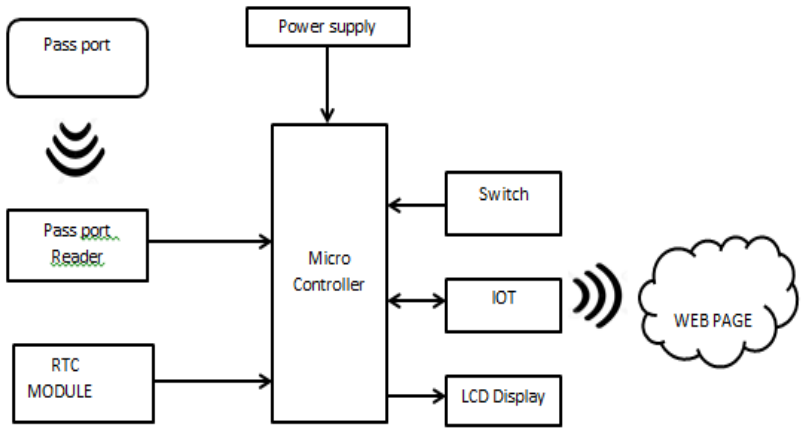


Fig.a. Proposed block diagram for E-Passport Verification

WORKING PRINCIPAL

In this system, smart card is given to the authorized person who will own all the details required for passport verification. All the details through modulation and demodulation on the RF signal which will be transmitted by the reader. This makes the system centralized by increasing the security. With this propose system, people can reduce issues like passport lost and documents missing and also they can able to know the visa limit before expiring. Arduino is an open-source project that created microcontroller-based kits for building digital devices and interactive objects that can sense and control physical devices. The project is based on microcontroller board designs, produced by several vendors, using various microcontrollers. These systems provide sets of digital and analog input/output (I/O) pins that can interface to various expansion boards (termed shields) and other circuits. The boards feature serial communication interfaces, including Universal Serial Bus (USB) on some models, for loading programs from personal computers. For programming the microcontrollers, the Arduino project provides an integrated development environment (IDE) based on a programming language named Processing, which also supports the languages C and C++. Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter. Arduino Uno has a number of facilities for communicating with a computer, another Arduino board, or other microcontrollers [2].

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 7.488 |

|| Volume 9, Issue 2, February 2021 ||

| DOI: 10.15680/IJIRCCE.2021.0902038 |

Arduino UNO

Fig.b.Arduino UNO

RFID READER: Radio Frequency Identification Reader (RFID reader) is a device used to gather information from an RFID tag, which is used to track individual objects. Radio Frequency waves are used to transfer data from the tag to a reader. The RFID tag it must be within the range of an RFID reader, in order to be read. RFID technology allows several items to be quickly scanned and enables fast identification of a particular product, even when it is surrounded by several other items.

Radio frequency identification (RFID) is one method for Automatic Identification and Data Capture (AIDC). RFID tags are used in many industries. An RFID system consists of three components: an antenna and transceiver and a transponder. The antenna uses radio frequency waves to transmit a signal that activates the transponder. When activated, the tag transmits data back to the antenna. An RFID reader's function is to interrogate RFID tags. The means of interrogation is wireless and because the distance is relatively short; line of sight between the reader and tags is not necessary. A reader contains an RF module, which acts as both a transmitter and receiver of radio frequency signals. The transmitter consists of an oscillator to create the carrier frequency; a modulator to impinge data commands upon this carrier signal and an amplifier to boost the signal enough to awaken the tag. The receiver has a demodulator to extract the returned data and also contains an amplifier to strengthen the signal for processing. A microprocessor forms the control unit, which employs an operating system and memory to filter and store the data. The data is now ready to be sent to the network [7].

RFID Reader

Fig.c. RFID Reader

REAL TIME CLOCK: The purpose of an RTC or a real time clock is to provide precise time and date which can be used for various applications. RTC is an electronic device in the form of an Integrated Chip (IC) available in various packaging options. It is powered by an internal lithium battery. As a result of which even if the power of the system is turned off, the RTC clock keeps running. It plays a very important role in the real time systems like digital clock, attendance system, digital camera etc. In applications where time stamp is needed, RTC is a good option. Using RTC for designing such application has always been a good designer's choice although the beginning might be a bit difficult. While designing any real time system which deals with time , there are two ways of handling the time factor. One is to generate the time internally which is done by programming the timers of the controller; and the other is to use an RTC. The following table shows the comparison of these methods while designing a real time application [5].

LCD DISPLAY: The LCD Display is designed for E-blocks. It is a 16 character, 2-line alphanumeric LCD display connected to a single 9-way D-type connector. This allows the device to be connected to most E-Block I/O ports. The LCD display requires data in a serial format, which is detailed in the user guide below. The display also requires a 5V power supply. Please take care not to exceed 5V, as this will cause damage to the device. The 5V is best generated from the E-blocks Multi programmer or a 5V fixed regulated power supply. The 16 x 2 intelligent alphanumeric dot matrix

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 7.488 |

|| Volume 9, Issue 2, February 2021 ||

| DOI: 10.15680/IJIRCCE.2021.0902038 |

displays is capable of displaying 224 different characters and symbols. A full list of the characters and symbols is printed on pages 7/8 (note these symbols can vary between brand of LCD used). This booklet provides all the technical specifications for connecting the unit, which requires a single power supply (+5V).

The main principle behind is that electric current is applied to the liquid crystal molecules. The minute this electric current is applied the liquid crystal molecules tend to untwist. As a result the angle of the top polarizing filter changes with regard to the liquid crystal molecule. Thus little light is then permitted to go via that particular LCD area and that area when compared to the others becomes darker. To make up an LCD screen, in the back a reflective mirror is setup. In addition to that an electrode plane is set on the top. The electrode plane is made up of indium-tin oxide. On the bottom side there is a glass with a polarizing film. The whole area of the LCD is enclosed by a common electrode and there is the liquid crystal substance on top of it. It is then followed by another piece of glass with a rectangle shaped electrode on the bottom and another polarizing film on the top. Both of them are kept at right angles. The mirror reflects the light that passes through the front of the LCD when there is no current and it is bounced back. Connected to a temporary battery is the electrode and the current from it will cause the liquid crystals in the middle of the common plane electrode and the electrode shaped like a rectangle to untwist. Hence light is blocked such that it is not able to pass through and that particular rectangular area looks blank.

Fig.d. LCD Display

IOT: The Internet of things (IOT) is the network of everyday objects — physical things embedded with electronics, software, sensors, and connectivity enabling data exchange. Basically, a little networked computer is attached to a thing, allowing information exchange to and from that thing. Be it light bulbs, toasters, refrigerators, flower pots, watches, fans, planes, trains, automobiles, or anything else around you, a little networked computer can be combined with it to accept input (especially object control) or to gather and generate informational output (typically object status or other sensory data). This means computers will be permeating everything around us — ubiquitous embedded computing devices, uniquely identifiable, interconnected across the Internet. Because of low-cost, networkable microcontroller modules, the Internet of things is really starting to take off.

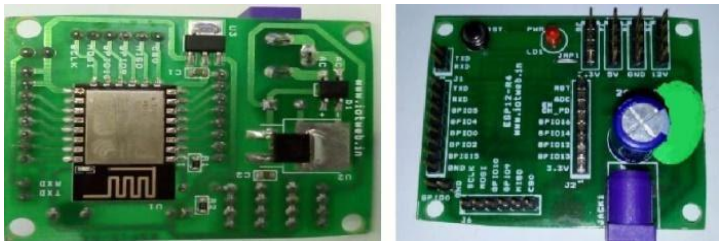


Fig.d. IOT Module

IOT Module is used for either transmit and receive purpose from the web page with secure authentication process [7].
WEB SERVER: The database of users can be securely stored in web servers (IOT Private Cloud) and it can be used for verification process and also helps users in case of missing E-passport .And also it shows how many times that the card can be Read.

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 7.488 |

|| Volume 9, Issue 2, February 2021 ||

| DOI: 10.15680/IJIRCCE.2021.0902038 |

III. COMPARISION RESULT ANALYSIS

S.NO	E-PASSPORT	PAPER PASSPORT
1.	High Authentication	Less Secure
2.	Passport Verification is done quickly	Passport Verification takes longer time
3.	Avoid theft for illegal business of stealing passport	Passport can be easily be threatened by the thieves
4.	Eliminate entry of illegal travellers	Entry of illegal travellers can happen easily.
5.	It does not consumes time for Passport verification and avoids missing of passport in crowds	It causes delay for passport verification and it is unsafe to carry in crowded areas.

IV. APPLICATIONS OF E-PASSPORT

- It is widely used in Airport checking system to have a centralized Secured system and avoid illegal entry of travellers.
- It can be used in Public sector units.
- Can be used in Hotels for Verification Processing.

V. RESULTS

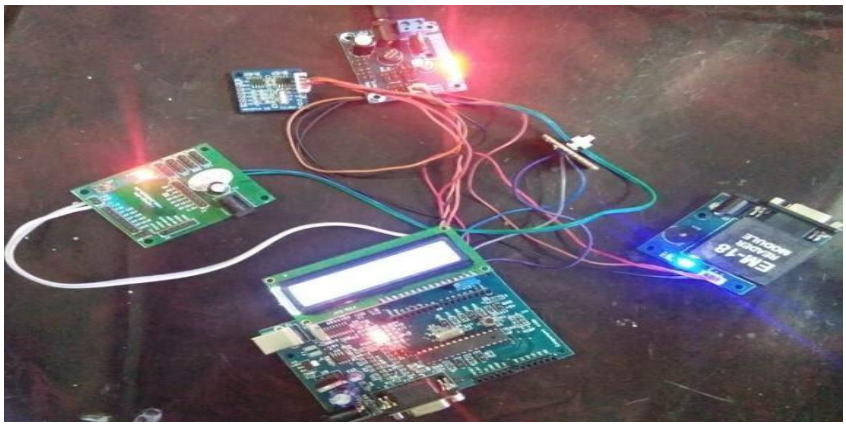


Fig.e. Output of our project

The output of the Smart Wireless E-Passport with Secured Communication Technology System Hardware is shown in the Fig.6.1.1. It gives quick passport verification and intimation of visa expiry. And also we used IOT private Cloud to renewal and access our data in any time.

VI. FUTURE SCOPE

As anticipated in the ICAO guidelines, e-passports will likely see use not just in airports but in new areas like e-commerce and they may also provide valuable experience in how to build more secure and more private identification platforms in the years to come. It has to be implemented in future by the government with secure authentication process.

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 7.488 |

|| Volume 9, Issue 2, February 2021 ||

| DOI: 10.15680/IJIRCCE.2021.0902038 |

VII. CONCLUSION

In this project, we have proposed a RFID based solution for managing the travel related government documents like passport, VISA and any immigration. This solution makes an effort to digitize the documents and store the data in a distributed TAG. We can use that across all participants.

REFERENCES

[1] Khaled Shehata, Hanady Hussien, Sara Yehia, "FPGA Implementation of RSA Encryption Algorithm for E-Passport Application", World Academy of Science, Engineering andTechnology ,Vol:8 2014-01-03, 2014.
[2] Sandeep Kakde, Somulu G., and Pravin Zode, "Performance Analysis Of Montgomery Multiplier for Public Key Cryptosystem," IEEE conference Tiruchengode,India , July 2013.
[3] William Stallings, Cryptography and Network Security Principles and Practices, 4th Edition,Person Education,Inc.,2006,ISBN 81-7758-774-9
[4] Shivani Kundra, Aman Dureja, Riya Bhatnagar, " The study of recent Technologies in E-Passport System", IEEE Global Humanitarian Technology Conference- South Asia Satellite(GHTC-SAS).,Trivendrum, India, September 2014.
[5] Jean Pierre Deschamps, "Hardware Implementation of Finite Field Arithmetic," The McGraw Hill Companies, Inc., ISBN 9780071545815
[6] Schomaker, L.: 'Advances in writer identification and verification'. Proc. Int. Conf on Document Analysis and Recognition (ICDAR), Parana, Brazil, 2007, pp. 1268–1273
[7] Juels, A., David Molnar, D., David Wagner, D.: 'Security and privacy issues in e-passports'. IEEE First Int. Conf. on Security and Privacy for Emerging Areas in Communications Networks, Athens, Greece, 2005
[8] Pattinson, N.: 'Securing and enhancing the privacy of the e-passport with contactless electronic chips'. Available at: IEEE XPLORE.
[9] Jacobs, B.: 'Biometry in passports'. Availble at: http://www.sos.cs.ru.nl/ research/society/passport/index.html
[10] BSI: 'Advanced security mechanisms for machine readable travel documents – Extended Access Control (EAC)'. Tech. Rep. TR-03110, Bonn, Germany, 2006
[11] Schouten, B., Jacobs, B.: 'Biometrics and their use in e-passports', Image Vis. Comput., 2009, 27, pp. 305–312
[12] Abid, M., Kanade, S., Petrovska-Delacretaz, D., et al.: 'Iris based authentication mechanism for e-passports'. 2nd Int. Workshop on Security and Communication Networks (IWSCN), Karlstad, Sweden, 2010
[13] Chabanne, H., Tibouche, M.: 'Securing e-passports with elliptic curves', IEEE Secur. Priv., 2011, 9, (2), pp. 75–78
[14] Wimalasiri, B, Jeyamohan, N: 'An e-passport system with multi-stage authentication: a casestudy of the security of Sri Lanka's e-passport', Global J. Comput. Sci. Technol., 2018, 18, pp. 14–20, ISSN:0975-4172. Available at: https://computerresearch.org/index.php/computer/article/view/1689, accessed 28 March 2019
[15] Saini, R, Narinder, R.: 'Comparison of various biometric methods', Int. J. Eng. Sci. Technol., 2014, 2, (I), pp. 24–30

BIOGRAPHY

D.r.P.Sivakumar, working as a professor & head , in ECE Department at GRT Institute of Engineering and Technology. He has published 17 Journals, 19 International & national Conferences. His area of interest in image processing & Networking.

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 7.488 |

|| Volume 9, Issue 2, February 2021 ||

| DOI: 10.15680/IJIRCCE.2021.0902038 |

Vignesh.D, is currently pursuing B.E. in Electronics and communication engineering (2017-2021) from GRT Institute of Engineering and Technology, Tiruttani , Tamil Nadu, India.

Vamsi Krishna Reddy.M, is currently pursuing B.E. in Electronics and communication engineering (2017-2021) from GRT Institute of Engineering and Technology, Tiruttani , Tamil Nadu, India.

Nishanth.D, is currently pursuing B.E. in Electronics and communication engineering (2017-2021) from GRT Institute of Engineering and Technology, Tiruttani , Tamil Nadu, India.

INNO SPACE

SJIF Scientific Journal Impact Factor

Impact Factor:
7.488

ISSN INTERNATIONAL STANDARD SERIAL NUMBER INDIA

निस्केयर NISCAIR

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

9940 572 462 6381 907 438 ijircce@gmail.com

www.ijircce.com

Scan to save the contact details