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Biometric Voting System to Eradicate Illegal Voting

P. Divyabharathi[1], C. Arul Murugan[2], A. Nivedita[3]
[1]Assistant Professor, Department of Electronics and Communication Engineering, Veltech Rangarajan Dr.Sagunthala R&D Institute of Science and Technology, Chennai
[2]Assistant Professor, Department of Electronics and Telecommunication Engineering, Karpagam College of Engineering, Coimbatore
[3]Assistant Professor, Department of Electronics and Communication Engineering, Sri Ramakrishna Engineering College, Coimbatore
[2]murugan.carul@gmail.com

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Abstract:

The main objective of this work is to implement the Aadhar card for voting and also eliminating separate cards for a single person for any type of work. The manual operation takes time for presiding officer or polling officer to check each and every voter and also causes illegal voting or fraud voting. And also, it takes time for checking votes based on their voter id. Therefore by replacing the process by a single device is fixed with the EVMs which can scan the biometric measures of the voters and checks with the database which is already taken in the Aadhar card. If only the voter ID card is taken to vote in ballot causes illegal voting. To eradicate illegal voting, Aadhar card must be implemented to authenticate the biometric measures of the voter. So that, only an authenticated voter is allowed to vote in the ballot boxes. The details of all citizenry in India is maintained by the recent Unique Identification (UID) Aadhar system along with their biometric data, which is unique to every citizen. The voters are allowed to enrollwith the link of biometric data in the UID database to the voting machine and also ensures that a person cast their vote only once. From UID the details of a person can be retrieved and matched for every citizen. This can be considered as best practice for the citizen's right to vote and remain stong in fair elections.

***Keywords*:** Adhar, Biometric, Electronic Voting, Fingerprint verification, Iris Segmentation, Iris Normalization.

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1. Introduction

The election should conduct properly for each and every candidate for a democratic country. In a democratic country, one who chooses his own leader/candidate to represent the group of society for their well being. In order to provide the supply and solving the problem and maintaining the people of the society/country and ensure their well being. The elections can be conducted by the government, they should stand equally to every citizen in a country. The people must have the freedom to vote for the rightful candidate. In some occasions, the elections are cheated/illegally used to vote for the wrong candidate. In old ages, people vote for the leaders to represent them for their own goods. After that, voting by papers created by the group of people. After the electronic age, the electronic voting machine came process the vote in order to save the paper and more data can be stored in the one single voting machine but there is a possibility to hack that machine. In this paper, we are going to implement biometric authentication using fingerprint scanner and iris scanner. Aadhar card is a unique ID for each and every person in India. It provides the databases which store the

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unique fingerprint pattern and Iris Images. And we are going to access the databases from UIDAI (unique identification authority of India) which manages and maintains biometrics. This paper changes the process of voting in India and It will be one of the secure and safe voting processes in the world. During the election, one must bring their Aadhar card to vote and avoids the other type of verification [7]. A person who is to vote for the election needs to scan their Aadhar Card which brings the specific database (it contains biometrics and personal details of a particular person) and it verifies person for eligibility and the person must verify the fingerprint pattern and Iris Images through the specific scanner. This proposed methodis carried out on a property based method towards fulfilling justified voting system. To minimize privacy vulnerabilities a specific approachis use with a specific voting range. This voting system is also implemented in a prototype. The componentized design has shifted to voting system provides weave multiple aspects to easily validate security aspects as a part of the design.

2. Existing Method

The election commission uses two types of voting systems in India. The methods are Ballot Paper System and Electronic Voting System (EVM).

2.1 Traditional Voting Process

Therec are two different phasesin traditional voting process (Ballot Paper System).

2.1.1 Authentication

Authentication is the process of providing the rights for the person to vote by providing ballot paper to cast their vote using his/her id of voting card. These process is done publically and is verified by presiding officers.

2.1.2 Voting

Voting deals with the process of casting the vote by folding the ballot paper and drop it into the box which is given in the protected booths.

2.1.3 Vote counting

After completion of voting process, the number of votes will be counted by the authorized personafter collecting the ballot boxes. The member of election committee opens the ballot boxes who are nominated by Indian election commission. Later the election gets completed, the results will be announced.

2.2 e-voting

Electronic Voting Machine (EVM) will give access to e-voting where the traditional voting process can be applicable. It is userfriendly so that both polling member and user to vote can operate the electronic voting machine easily. There are two units Ballot unit and control unit. The data is stored in control unit hence it is the main unit in EVM which controls the function of the machine. The cable of five meter length is used to connect the ballot and control unit together. Presiding officer holds the control unit since it controls the overall function of EVM. Ballot unit is placed in booth for voting process.

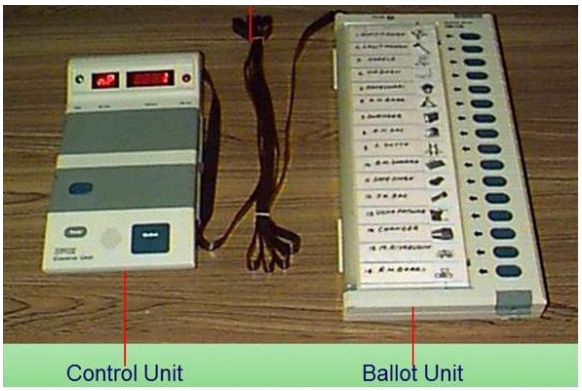

Figure 1: Electronic Voting Machine

2.2.1 Authentication

Authentication is needed for the person to establish their rights to vote in election. The verification process is carried out by presiding officier and it is done publicly.

2.2.2 Voting

Voting is the process of casting the vote in the balloting place on EVM. Following this process, EVM is protected by the box.

2.2.3 Vote counting in e-voting

Vote counting can be processed at the end of the voting system. The EVM boxes which are protected can be collected by presiding officials which contains all votes and are counted by election commission of India and finally result will be announced.

3. Drawbacks

3.1 Drawbacks in BVS

- BVS system consumes more time
- Requires more paper and man power to process.
- Not reliable incase of any damage to ballot paper.
- Not efficient and doeasnot have any automation extension in this sysem.

3.2 Drawbacks in EVS

- Can tamper the machine during manufacturing hence can easily manipulate the actual working of the system.
- Due to virus the entire data which is stored may get damage.
- Since EVM is vulnerable to programming, it may affect by hackers.
- Not secure since there is no any mechanism to verify the identity of voter before casting, the voters can cast illegal votes.

4. Proposed Method

4.1 Biometric voting system

For measuring the biological information such as fingerprints, irises, facial pattern we go for biometric system. Biometric is mainly used for authentication

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purpose and it is used to provide framework to get rid of illegal voting system.

The most widely used function of biometric voting system is to scan the fingerprint pattern and iris pattern of the person who is going to cast his/her vote. Person can cast their vote only for one time and thereby it achieves high reliability and as only the authorized person can cast their vote only when their data in biometric system ie., fingerprint and iris match to the person ie., voter matches then they can cast their vote. This provides high security and high accuracy.

Especially for voter identification or authentication this proposed method uses thumb impress and iris pattern .In each individual the thumb impression and iris are different and also unique. The thumb impressions and iris pattern are already exist in Aadhar database of all the voters in the constituency.In this system all the illegal votes and repetition of votes are checked To conduct the elections in a truthful manner and rigging free this system can be utilized.The human fingerprint is retained as very common identifier even if various techniques are evolved and the biometric method make it all easier to each individual with law enforcement and usually offering the benefit of iris recognition system. This extend to the reinforcement of fingerprint scanners in human identification often proved successful and iris scanner being able to find quickly with the method of identifying individuals and access a appetite for the benefits of identification. Various number of reseach has been reported [8-23].

In today's world, it is easy to identify within a few seconds with reasonable accuracy. Nowadays in biometric recognition system, to identify the information biometric template are most often used in UIDAI (Unique Identification Authority of India) which manages and maintains Aadhar ID and person biometric details like a fingerprint and iris pattern. The candidate biometric template takes to perform identification captured by the biometric device utilized for processing and matching steps are performed. Nowadays the voters can cast their votes with the advancement of recent technologies.

4.2. Implementation of Proposed work

In our proposed method, the information of a voter are collected from UIDAI database. All the details concerning the people are stored in this database. The voter's personal and biometric information are taken from UIDAI database which are stored on the personal computer.

4.2.1 Flow Chart

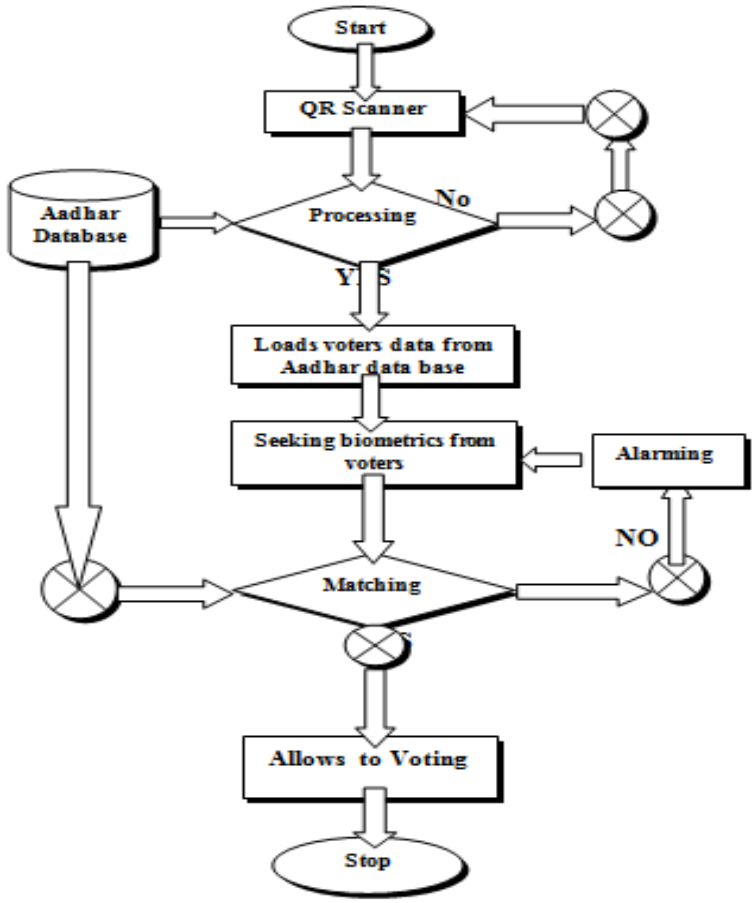

Figure 2: Flowchart

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4.2.2. Block Diagram of Proposed method

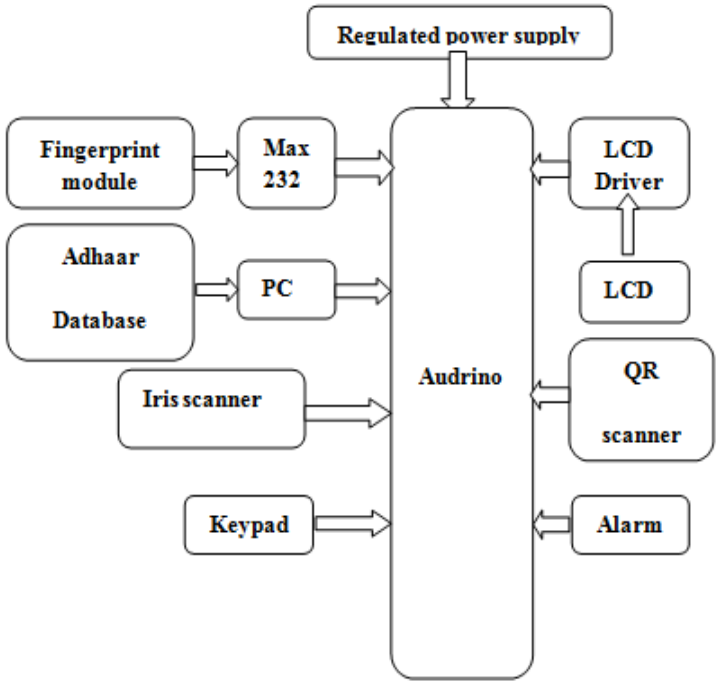

Figure 3: Biometric Voting System Block diagram

4.3 Fingerprint Module Implementation

A serial fingerprint scanner called R305 Fingerprint Module is used for implementation which can be obtained under any conditions in PC R305. MAX232 IC is used as a connecting link for any controller. It is quite common for pre-specified classes to store fingerprint and to examine fingerprint with the better grip ofoutput variables. Fingerprint processing have an impact on features of fingerprint enrollment and suitable for online processing with fingerprint matching evolved from matching ratio. In the couse of enrollment it is necessary to enter the finger five times to perform the tasks. Through optical sensor the finger is sensed and match up to templates in finger library to yield the results. This mode of set up will indictaes the impact of success or failure when it is matching [4].

Figure 4: Finger print scanner

4.4 Iris scanner Implementation

One of the mostreliable techniques used in biometrics is IRIS recognition for human identification. The Daugman algorithm shows a rate of 200 billion [1],[2]. The Aadhar project in India widely uses Iris recognition techniques for implementation process.

This iris recognition system employs the following steps as a scientific method.

1) Analysis (A): Trained examiners investigate the features of iris crypts to detect the process.
2) Comparison (C): Various detected features are compared with thefeature patterns based on the scores of similarity (or dissimilarity) using a rigorous process.
3) Evaluation (E): Based on the score(s) the preliminary conclusion are formed.
4) Verification (V): Finally, manual inspections are done by the trained examiners.

In order to make credible decisions.

The iris image of each person is the input to PC. In PC the iris image is compared with existing image. The computer sends the command the person is valid to the microcontroller if the image is matched and then displayed. If it not matches, it gives an alarm and displays an error message. If anyone tries to poll their vote beyond the time limit, the system will be blocked.

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Iris recognition:

Iris features extraction:

Texture describe the scale of changes of all surfaces for classifying the images each having properties of homogeneity for content based access. It comprises the details of structural arrangement of the Iris surface, such as; fabric, leaves, clouds and bricks, etc. The relationship of the surface area to the surrounding environment is also explained. It describes the feature about physical composition of a, Directionality, surface coarseness, Roughness and Contrast.

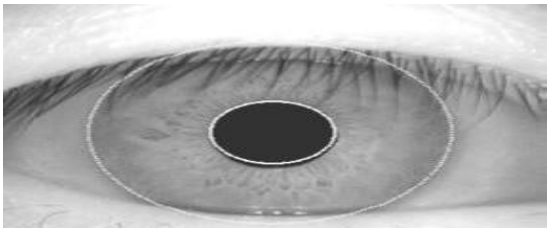

Figure 5: Iris Segmentation

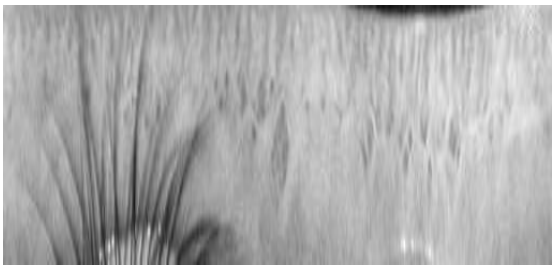

Figure 6: Iris Normalization

The texture indicate a distinct features of an image. To capture the spatial values of gray-level analysis of texture are also considered to assess the values.

Basic steps in iris recognition

Step I:

To capture iris images, it needs the necessity of cameras and sensors which are dealt with image acquisition in which features are extracted. The quality of captured image is enhanced and it is necessary to analyse and preprocess with a clear iris and pupil part.e.g., In histogram equalization filtering process is used to remove the noise.

Step II:

Segmentation is processed next in iris recognition where the eye images areisolated. A methodology is used to divide the artifacts and circular iris region are also located. The clarity of the image are based on the quality of segmentation and it is calculated by the iris boundaries.

Step III:

The segmented iris are normalized in the third step. Normalization helps to increase accuracy by proving accurte recognition of individuals. Comparisons among templates can be made [3] based on the significant features of the encoded iris.

The Hamming distance with tracks of two iris templates are calculated by the significant bits which are employed by the Hamming distance algorithm. Matching process use the similarity in Euclidean distance and find a short strings with minimum value for identification. Iris is fused with the statistical features of many other biometric database using image feature vectors and it's recognized by exclusive use of Euclidean or Hamming distance [4]. It can be easy to identify person information along with the matched person authentication to extract data from the hidden image for security.

Figure 7: Iris segementation

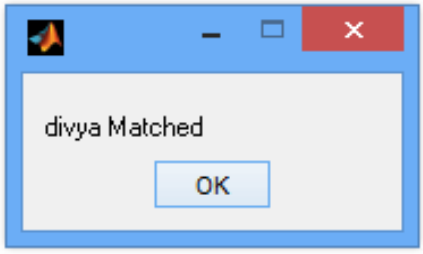

Figure 8: Iris recongnition results.

In the work of Libor thesis, the Hough transform is used for the segmentation system. It is easy to recognize eyelashes, iris and pupil region, reflecions and excluding eyelids. In Log-Gabor the iris region are filtered by ID and also normalised. An unique pattern is created with quantized four levels and also extracted with phase data of the iris. In order to classify and compare the patterns a technique of Minkowski distance is used. The database of eye images are collected for testing purposes which are available in Chinese Academy of Sciences. From the open source iris recognition software developed by Libor Masek [5] the output was taken and results are displayed.

5. Conclusion

The advanced technology of this biometric voting system reduces the illegal practices of votingand it enables increase use of finger print to examine by elections in India. This will retain a access privilges to provide a quick preclude that are equally manifest of collective decisions. Through a system of representation it is easy to nominate leaders by the citizens, thus to make right decisions in the democracy.

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6. Hardware Implementation

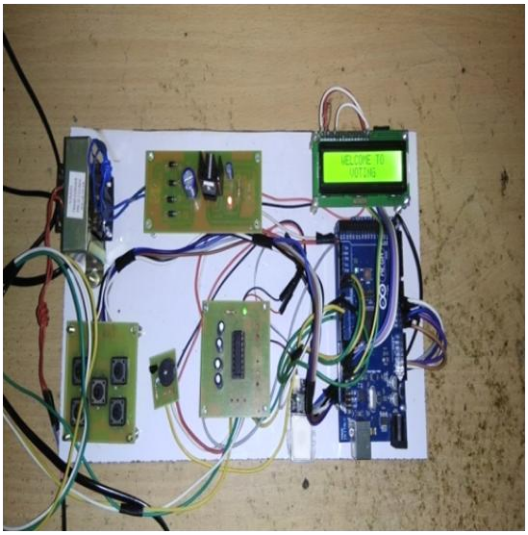

Figure 4.3: Implementation result

The above figure shows the hardware implementation of biometric voting system with iris scanner and it is observed from the system that it is very fast and error free. Hence illegal voting can be avoided by this system.

7. Future Scope

As technology develops day by day every person is engaged in their day to day life. Some may migtate to other location to lead their life and they may not have sufficient time to cast their vote in their registered location so they can cast their vote using web technology, In future security system can design and develop in web technology being determinant of voting system and ability to provide high security ensuring systematic standards.

References

[1] Iris recognition based voting system, Ms. J Nithya, G. Abinaya, B.Sankareswari, M.Saravana Lakshmi in International Conference on Science, Technology, Engineering & Management [ICON-STEM'15].

[2] Recognition of Human Iris Patterns for Biometric Identification by Libor Masek www.csse.uwa.edu.au/~pk/studentprojects/libor/LiborMasekThesis.pdf

[3] Iris recognition based voting system, Ms. J Nithya, G. Abinaya, B. Sankareswari, M.Saravana Lakshmi in International Conference on Science, Technology, Engineering & Management [ICON-STEM'15]

[4] J. Daugman, "High Confidence Visual Recognition by a test of Statistical Independence", IEEE Trans. Pattern Analysis and Machine Intelligence, Vol. 15, No.11, pp.1148-1161,1993.

[5] Firas Hazzaa, Seifedine Kadry, New System of E-Voting Using Fingerprint, International Journal of Emerging Technology and Advanced Engineering.

[6] Soumyajit Chakraborty, Siddhartha Mukherjee, Bhaswati Sadhukhan, Kazi Tanvi Yasmin, Biometric Voting System using Adhar Card in India, International Journal of Innovative Research in Computer and Communication Engineering.

[7] R. Murali Prasad, Polaiah Bojja, Madhu Nakirekanti, AADHAR based Electronic Voting Machine using Arduino**,** International Journal of Computer Applications (0975 – 8887) Volume 145 – No.12, July 2016.

[8] C Arul Murugan, B Banuselvasaraswathy, K Gayathree (2017). Analysis of Gate Oxide Break down in Static Random Access Memory (SRAM) Cells. Journal of Innovation in Electronics and Communication Engineering, vol(7), 31-35.

[9] SS Priya, Karthigaikumar P, Siva Mangai NM, Kirti Gaurav Das, P (2016) An efficient hardware architecture for high throughput AES encryptor using MUX based sub pipelined S-box. Wirel Personal Commun Int J (Springer) 88(4).

[10] C Arul Murugan, B Banuselvasaraswathy, K Gayathree (2019). High-Voltage Gain CMOS Charge Pump at Subthreshold Operation Regime for Low Power Applications. Innovations in Electronics and Communication Engineering, Springer, Singapore, 417-426.

[11] P Karthigaikumar, & Soumiya Rasheed (2011). Simulation of image encryption using AES algorithm. IJCA special issue on "computational science-new dimensions & perspectives" NCCSE, 166-172.

[12] K Naveen Jarold, P Karthigaikumar, NM Sivamangai, R Sandhya, Sruthi B Asok (2013). Hardware implementation of DNA based cryptography. IEEE Conference on Information & Communication Technologies (ICT), 696-700.

[13] N.M. Siva Mangai S. Sridevi Sathya Priya, P. Karthigaikumar (2014). Mixed Random 128 Bit Key Using Finger Print Features and Binding Key for AES Algorithm. International Conference on Contemporary Computing and Informatics (IC3I), 1226-1230.

[14] N. Anitha Christy, P. Karthigaikumar (2012). FPGA implementation of AES algorithm using Composite Field Arithmetic. International Conference on Devices, Circuits and Systems (ICDCS), 713-717.

[15] C. Arul Murugan, N. Nandhagopal, S. Navaneethan (2018). The reordered deblocking filter and SAO architecture for HEVC system.

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ISSN: 0193-4120 Page No. 1- 7

International Journal of Engineering & Technology,vol(7), 617-621.

[16] M. Ishwarya Niranjana C. Arul Murugan,B. Banuselvasaraswathy, K. Gayathree (2018). Efficient high throughput decoding architecture for non-binary LDPC codes. International Journal of Engineering & Technology, vol (7), 195-200.

[17] N. Agnes Shiny Rachel K. Gayathree,C. Arul Murugan, B. Banuselvasaraswathy, M. Ishwarya Niranjana (2018). A Robust Single Ended 10 T Schmitt Trigger based Sram Cell with Enhanced Read/Write Assist Techniques. International Journal of Pure and Applied Mathematics, vol(118), 411-416.

[18] Banuselvasaraswathy. B Gayathree. K, Rajkumar. S, Arul Murugan (2019). A Fuzzy Based Ultra-Nano Water Purification Technique. International Journal of Innovative Technology and Exploring Engineering (IJITEE), vol (8), 453-457.

[19] B Banuselvasaraswathy, C Arul Murugan, P Karthigaikumar (2019). Automatic Retinal Lesions Detection of Diabetic Retinopathy Using Curvelet Based Enhancement. Indian Journal of Public Health Research & Development, vol(10), 1029-1035.

[20] B. Banuselvasaraswathy, C. Arul Murugan (2015). High Gain Enhanced CMOS Charge Pump with Reduced Leakage and Threshold Voltage. International Research Journal of Engineering and Technology (IRJET), vol(2), 2251-2256.

[21] Daugman J, "How iris recognition works", IEEE Transactions CSV, Vol.14, No.1, pp. 21-30, 2004.

[22] Karthigaikumar P, Anitha Christy N, Siva Mangai NM (2015) PSP CO2:An efficient hardware architecture for AES algorithm for high throughput. Wirel Personal Commun Int J (Springer) 85(1):305-323.

[23] Chinnandi Arul Murugan & P. KarthigaiKumar (2018). Survey on Image Encryption Schemes, Bio cryptography and Efficient Encryption Algorithms. Mobile Networks and Applications, https://doi.org/10.1007/s11036-018-1058-3.