An Enhanced Secured Approach To Voting System

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Abstract- In this system, an online voting authentication technique is proposed which provides biometric as well as password security to voter accounts. The basic idea of steganographic method is to merge the secret key and pin number with the cover image which produces a stego image which looks same as the cover image. The secret key and pin number is extracted from the stego image at the server side to perform the voter authentication function. This system greatly reduces the risks as the hackers have to find the secret key, pin number, fingerprint and facial image, which makes the election procedure to be secure against a variety of fraudulent behaviors.

The purpose of the proposed work is to reduce the man power provide secure voting system, quick result announcement and allows voters to poll their vote easily and very quickly. This work gives secured voting system through QR codes and Biometric measures. The basic idea of this proposed system is when the voter entering in to the polling station, the details are shown and to verify the particular person the fingerprint will be taken. If the information is valid, then the ballot sheet is opened in the system. Overcoming the disadvantage of other system of voting, this system is designed as user friendly and it makes the election system simple and elegant. After voting, the information will be stored in the database which helps for quick and easy result announcement.

I. INTRODUCTION

1.1 ELECTRONIC VOTING

Electronic voting is a term includes several different types of voting, embracing both electronic means of casting a vote and electronic means of counting votes. For many years, paper-based ballot is used as a way to vote during polling days. This matter put an inefficient way of voting process as people have to queue up to register their name before they can vote. Furthermore, the traditional way of voting will take a long process and time. So, the new electronic voting using workings will become the best solution for the matters; besides provide easier way of voting.

Compared to existing voting system the Electronic voting has several advantages like: Electronic voting system is capable of saving extensive printing stationery and transport of large volumes of electoral material. It is easy to transport, store, and maintain. It completely rules out the chance of invalid votes.

The proposed work provides the results in reduction of polling time, resulting in fewer problems in electoral preparations, law and order, candidate’s expenditure, etc. and easy and accurate counting without mischief at the counting centre. It is also eco friendly.

II. TECHNIQUES:

2.1 Authentication For Online Voting Using Steganography And Biometrics

Steganography Method:
Steganography is the art and science of writing hidden messages in such a way that no one, apart from the sender and intended recipient, suspects the existence of the message, a form of security through obscurity.

ADVANTAGES:
- Authenticity of an individual.
- Accuracy and reliability.
- Against from hacking.

DISADVANTAGES:
- Limitation in searching performance.
- Need more time.

2.2 Novel Design Of Electronic Voting System Using Fingerprint

Minutiae Based Matching:
Minutiae matching method balances the tradeoffs between maximizing the number of matches and minimizing total feature distance between query and reference fingerprints. A two-hidden-layer fully connected neural network is trained to generate the final similarity score based on minutiae matched in the overlapping areas.

Fig.2.1 Minutiae Based Matching
ADVANTAGES:
- Fake persons are identified.
- Accuracy.

DISADVANTAGES:
- Complex distortions among the different impression of the same finger.

2.3 Evaluating Electronic Voting Systems Equipped With Voter-Verified Paper Records

Cryptography And Steganography:
Cryptography and Steganography are well known and widely used techniques that manipulate information in order to cipher or hide their existence respectively. Steganography is the art and science of communicating in a way which hides the existence of the communication. Cryptography scrambles a message so it cannot be understood; the Steganography hides the message so it cannot be seen. Even though both methods provide security, a study is made to combine both cryptography and Steganography methods into one system for better confidentiality and security.

ADVANTAGES:
- Able to change the cover coefficients randomly.
- Accuracy.

DISADVANTAGES:
- Complexity of elections

2.4 Mobile Voting Using Global System For Mobile Communication (GSM) Technology And Authentication Using Fingerprinting Biometrics And Wireless Networks

GSM Network:
GSM is a digital wireless network standard widely used in European and Asian countries. It provides a common set of compatible services and capabilities to all GSM mobile users. The services and security features to subscribers are subscriber identity confidentiality, subscriber identity authentication, user data confidentiality on physical connections, connectionless user data confidentiality and signaling information element confidentiality.

ADVANTAGE:
- Easy and accurate counting.
- Cheaper rates of services
- Secured method of voting

The Risk Of Electronic Voting
- Internet Voting:
The casted vote of a secure and secret electronic ballot that is transmitted to election officials using the internet.
- DRE Voting System:

A direct-recording electronic (DRE) voting machine records votes by means of a ballot display provided with mechanical or electro-optical components that can be activated by the voter that processes data by means of a computer program; and that records voting data and ballot images in memory components.

III. BIOMETRICS

- Biometric recognition means by measuring an individual's suitable behavioral and biological characteristics in a recognition inquiry and comparing these data with the biometric reference data which had been stored during a discovering process, the identity of a specific user is determined.
- Automatic fingerprint identification is one of the most reliable biometric technologies. This is because of the well known fingerprint distinctiveness, persistence, ease of attainment and high matching accuracy rates.

ADVANTAGES:
- User convenience
- Better security
- Higher efficiency
- More reliable
- It cannot be easily misplaced, forged, or shared
3.1 OBJECTIVE OF BIOMETRICS

- As the fingerprint of every individual is unique, it helps in maximizing the accuracy. A database is created containing the fingerprint of all the voters in the electorate. Illegal votes and repetition of votes is checked for in this system. Hence if this system is employed the elections would be fair and free from tackling.

- Fingerprint recognition or fingerprint authentication refers to the automated method of verifying a match between two human fingerprints. Fingerprints are one of many forms of biometrics used to identify an individual and verify their identity. Extensive research has been done on fingerprints in humans. Two of the fundamentally important conclusions that have turned out from research are: (i) a person's fingerprint will not naturally change structure after about one year after birth and (ii) the fingerprints of individuals are unique. Even the fingerprints in twins are not the same. In practice two humans with the same fingerprint have never been found [7].

3.3 QR Code:

Quick Response Code is defined as a two dimensional barcode, a machine readable optical label that contains information about the item to which it is attached. A QR code uses the following standardized encoding modes, to efficiently store data and extension may also be used for the effectiveness.

- Numeric
- Alphanumeric
- Byte/Binary

The format information records two things: the error correction level and the mask pattern used for the symbol. Masking is used to break up patterns in the data area that might confuse a scanner, such as large blank areas or misleading features that look like the locator marks. The mask patterns are defined on a grid that is repeated as necessary to cover the whole symbol. Modules corresponding to the dark areas of the mask are inverted. The format information is protected from errors with a BCH code, and two complete copies are included in each QR symbol.

The use of QR codes results in the low cost implementation in this system and they can have the tendency to overcome the functionalities of the existing system. The whole symbol of the code can be masked on a grid that can be repeated to obtain it.

4.1 PROBLEM DEFINITION

The online voting system seems to be risky, it is difficult to come up with a system which is perfect in all senses. So a Quick Response(QR) image helps to identify the right person and use biometrics as authentication. It is useful to achieve confidential transmission over a public network. The main aim is to present a new voting system employing biometrics in order to avoid unauthorized access and to enhance the accuracy and speed of the process so that one can cast his vote irrespective of his location.

Objective:

The objectives of biometric recognition are user convenience, better security and higher efficiency. These techniques makes it possible to use the fingerprint of a person to authenticate him into a secure system, So the Electronic voting system has to be improved based on the current technologies of biometric system. A prerequisite for authentication is enrollment, in which the biometric features are saved.

Biometrics is the automated recognition of individuals based on their behavioral and biological characteristics. Biometric recognition means by measuring an individual's suitable behavioral and biological characteristics in a recognition inquiry and comparing these data with the biometric reference data which had been stored during a learning procedure, the identity of a specific user is determined. Because biometric identifiers cannot be easily misplaced, forged, or shared, they are considered more reliable for person recognition than traditional token or knowledge based methods.
Fig. 4.1 System overview

A user who enter into the system will have the QR code image and it is used to authorize the same user and to confirm the identity, we authenticate the same user by getting his fingerprint using the fingerprint scanner and only if they are designated as the authenticated user, they will be allowed to view the ballot sheet and can cast the vote. Once casting is done, the result is stored in the separate database. The process is repeated for all the constitute identities and the final results can easily be viewed.

Fig. 4.2 Flowchart

The fingerprint scanner is a unique way of capturing the identity of a person and confirming them over the righteousness of the record. The processing includes Core print estimation, sectorization, gabor filter, feature extraction and then verification.

// Create the ByteMatrix for the QR-Code that encodes the given String
Hashtable hintMap = new Hashtable();
hintMap.put(EncodeHintType.ERROR_CORRECTION, ErrorCorrectionLevel.L);

QRCodeWriter qrCodeWriter = new QRCodeWriter();
BitMatrix byteMatrix = qrCodeWriter.encode(qrCodeText, BarcodeFormat.QR_CODE, size, size, hintMap);

4.2 VERIFY:
if(obj==miverify)
{
    flag=Check.verify(v1.ipimg);
    System.out.println("flag="+flag);
    if(flag==1)
    {
        JOptionPane.showMessageDialog(null,"Verified.Please give your vote","Information",1);
        Vote vv=new Vote();
display(vv);
    }
    else
    {
        JOptionPane.showMessageDialog(null,"You are not eligible to Vote","Information",1);
    }
miverify.setEnabled(false);
//miresult.setEnabled(true);
}

V. SYSTEM TESTING

5.1 INTRODUCTION

The testing phase involves the testing of the developed system using various kinds of data. An elaborated testing of data is prepared and a system is tested using the test data. It is mainly used to improve the quality and for verification and validation. While testing, errors are noted and corrections remade, the corrections are also noted for future use.

5.2 UNIT TESTING

Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program input produces valid outputs. All decision branches and internal code flow should be validated. It is the testing of individual software units of the application, it is done after the completion of an individual unit before integration. This is a structural testing, that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application, and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results.

Each units in the system are separately tested and is managed to get the expected output. These units in the system are the separate modules that are used in the system and they represent a process implemented in the system. the functionality of the system is tested with the help of this process of testing method. All decision
branches and the internal code flow should be validated to produce a valid output.

5.3 INTEGRATION TESTING

Integration tests are designed to test integrated software components to determine if they actually run as one program. Testing is event driven and is more concerned with the basic outcome of screens or fields. Integration tests demonstrate that although the components were individually satisfaction, as shown by successfully unit testing, the combination of components is correct and consistent. Integration testing is specifically aimed at exposing the problems that arise from the combination of components.

When the modules are tested separately, they are also tested for the integration between them. When the first module is executed, it must make its path itself to the next module. These are said to be event driven and this is referred using the integration testing.

5.4 TEST CASE

The system is tested by providing the invalid images or the images that is not present in the database. For a QR image present in the database, providing the inappropriate fingerprint image will also result in the disqualification of the user. Thus, validating the system.

<table>
<thead>
<tr>
<th>INPUT A</th>
<th>INPUT B</th>
<th>RESULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>User1.QRimage</td>
<td>User1.Fingerprint</td>
<td>True</td>
</tr>
<tr>
<td>User1.QRimage</td>
<td>User2.Fingerprint</td>
<td>False</td>
</tr>
<tr>
<td>User2.QRimage</td>
<td>User1.Fingerprint</td>
<td>False</td>
</tr>
</tbody>
</table>

fig 5.1 Test case

VI. CONCLUSION

The proposed voting system benefits in user authentication method through fingerprints, the polling process is made easy with the use of the QR codes. The main benefit is time consuming comparatively less than the older voting system. The system can be implemented easily in any areas where voting needs to be done.

The future enhancement is to analyze the compatible support over the various distances in wide area manner. The implementation can be simple and is made effectively with the accuracy. This system can also be used in any organisation or even an association which conducts the voting to select their respective presidents. In those areas, all the members can be given only with the QR codes that were made in the private manner specially to use inside the organisations.

The use of QR code is itself a secure one where the biometrics can stay only as a additional security feature in the system. In future, we could only see the trend of QR codes vastly. Though they are mainly used for the purpose of advertisements now, their implementation in a system for authentication would definitely bring a change in the future world.

This can be implemented using phones if the emerging fingerprint scanners in smartphones like iPhone 5s and Samsung s5 reaches to the hands of the entire society. Thus, making it online and easy.

REFERENCES