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AN APPLICATION FOR ONLINE CORPORATE ELECTIONS USING VISUAL CRYPTOGRAPHY SCHEME

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Abstract - *Voting process has a great strength in deciding the fate of our nation or an organization. Voting is the right of the people to choose their leader. However, are current voting system has not been so successful due to the security and privacy flaws. But with the time of the technological advancements it seems, there must be a better way of voting than the way it's been handled today. Visual cryptography is a technique of encrypting the image in such a way that the original image can be obtained if correct share is provided. The online voting for corporate companies is to conduct elections through which the stakeholders can choose their board of directors. The employee can cast his/her vote by entering a secret key. The secret key is obtained by merging 2 shares using visual cryptography scheme. Each share is a black and white dotted image. The share is generated in such a way that original image cannot be predicted. The administrator sends share 1 to the employee after successful employee registration for election. After the employee login the application, the share 2 will be available at the time of election. The employees can cast their vote from any location. Only once an employee can cast his/her vote. Hence, visual cryptography in voting system increases security and authenticity. It offers benefits like increased voter participation and easy-to-use interface to user.*

***Key Words*: Voting system, Corporate elections, Online voting, Visual cryptography, Security shares.**

1. INTRODUCTION

One of the most important features of democracy which is common to all individuals is the act of election. Government thus encourages individual freedom in line with the law, so that people can make their own choice. It not only provides an opportunity to the people to choose their leaders, but also to express their ideas on issues. With the current voting system, elections are conducted in such a way that the voters must be present at the voting site to cast his/her vote. This will decrease the participation of the voters. The election process requires lots of work needed to be done prior to the election. It includes a lot of manual work which is very time-consuming and man power is wasted. The current voting system has more drawbacks which include privacy violation, election disturbance, invalid votes, proxy voting, modification of votes, and distortion in results[1][7]. Online voting can overcome these drawbacks. It has come up as a replacement to the paper based voting to reduce redundancy and inconsistencies.

Visual cryptography is a technique of encrypting image. Visual cryptography enables security, privacy, authenticity, and simplicity to the system. It is easy to handle. Voting can be done from any place. Even though the branches of the companies are situated in different parts of the country or world the elections can be conducted easily and efficiently in proper manner using the online voting application[9]-[11]. This application also provides an advantage which allows the administrator to view the changes in the status of the application simultaneously. This application also ensures that only once a voter can cast his/her voter. Re-voting and modification of vote cannot be done. Proxy voting will be prohibited. Once the election process is done the results will be displayed immediately. In this paper 2 out of 2 Visual Cryptography Scheme is used for better efficiency. This kind of visual cryptography is incredibly straightforward. The image which has the secret key is divided into two shares. These two shares are required to be merged together to reveal the original image.

2. EXISTING SYSTEM

The most commonly practiced voting technique is paper based, in which voters make their preferences using paper ballots. It is time-consuming and not environment friendly. The current voting system uses EVM in which the voters need to press a button that corresponds to their chosen candidate. EVM can tamper during manufacturing. EVM does not provide any mechanism to verify the valid votes [7][8]. Online voting makes use of the internet to cast the vote. The main aim of the online voting is to increase voter's participation. Online voting provides security and transparency. It intends to speed the counting of ballots, cast vote from any location and reduce the election cost [10][11].

In preferential online voting method the voters can assign different points to different candidates. The drawback with this is, votes get distributed and minimum vote eligibility won't be met [3]. Security is not provided to the entire voting process. The results are not displayed immediately [1]. Vote once cast, should not be able to modify. There is a possibility the voter can change or update their vote by the influence of others [2]. To overcome all these drawbacks we are proposing a visual cryptography based online voting application.

3. PROPOSED SYSTEM

We propose a visual cryptography based secure online voting application for corporate companies. It facilitates the corporate companies to conduct elections for different posts such as a president, manager, etc. 2 out of 2 visual cryptography scheme is used. The working of the proposed system is shown in figure 1. The image which has the secret key hidden is divided into two shares. These shares are then merged to reveal the original image by which we can get the secret key [4][6]. Using the secret key the employee can cast his/her vote. Share 1 will be sent to the employee after successful employee registration. After the employee login the application, share 2 will automatically be available, at the time of election. Employee must upload share 1, so that both shares can be merged to display the secret image. Using visual cryptography, the secret image is divided into two shares. In this one image contains random pixels and other contains the secret information. It is impossible to get the secret information from one of the images. Hence, visual cryptography in voting application enables security and authenticity which enables secure and easy-to-use interface to users.

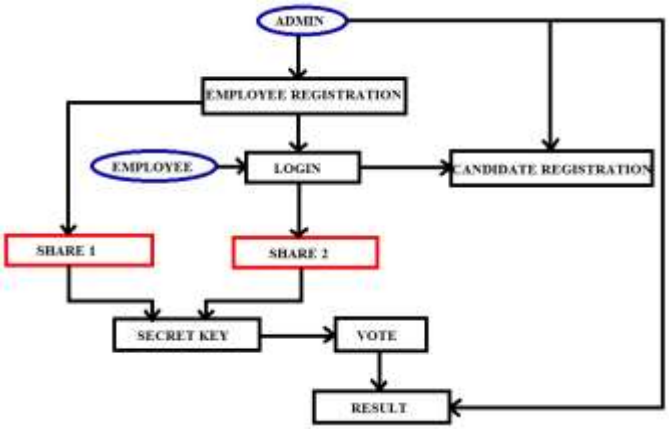

Figure -1: Architecture Diagram

4. SYSTEM IMPLEMENTATION

The proposed system has Admin and Employee session. Once we install and run this application, the home page will be displayed having links as Admin Login and Employee Login. The proposed system has three modules which are:

A. EMPLOYEE REGISTRATION AND LOGIN

The admin can log into the system by entering correct username and password. The admin home page consist of employee registration, candidate selection process and election details. The admin can register the employee by entering his/her personal details. All these details will be in inserted into the database and a mail is sent to the employee's mail id which includes username and password. Using these credentials employee can login the application. Employee home page has options are like candidate details, election details and voting page. Employee can view the candidate details and election details by clicking on the candidate details and election details tab respectively. If an employee wants to stand as a candidate in an election then he/she has to click on candidate details button that is available in the home page. Admin will then validate the candidate registration. Admin can only set the election details such as date and time. Only during the election period, the voting page link will be enabled.

B. VISUAL CRYPTOGRAPHY SCHEME

Clicking on the voting link an alphanumeric random key will be generated. Using this secret key, a image will be generated. Since we are using two out of two visual cryptography scheme, the secret image is divided into two shares. Each pixel of the secret image is divided into two blocks. There are always same numbers of white and black blocks, i.e., one white block and one black block. For each block 1, block 2 can have two states either it is identical or inverted. If block 1 and 2 are identical, it is called grey or empty pixel. If they are inverted, they are called black or information pixel. 2 out of 2 Visual Cryptography Scheme's pixel representation is shown in figure 2. Share one contains random pixels, and share two contains the secret information. Share one is send to the employee's mail ID after successful employee registration and share two will be available at the voting site.

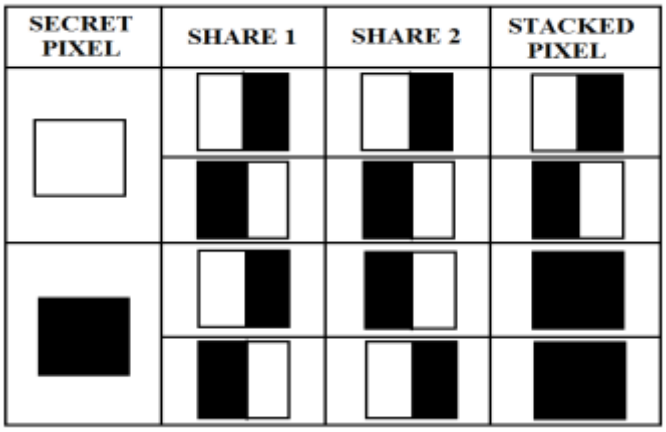

Figure -2: 2 out of 2 Visual Cryptography Scheme

C. IMAGE AUTHENTICATION AND ELECTION RESULT

Share 2 will be available at the time of election and employee has to upload share 1. Both the shares will be merged. If both the shares are valid then the secret image that contains the secret key will be displayed as shown in figure 3. Employee has to enter this secret key and click submit button. Voting page will be displayed. The employee has to cast the vote to the candidate of their choice. The status of the election will be updated and admin can view these changes simultaneously. When the election process is done, employees can view the results immediately. Candidate with the maximum number of votes wins the election.

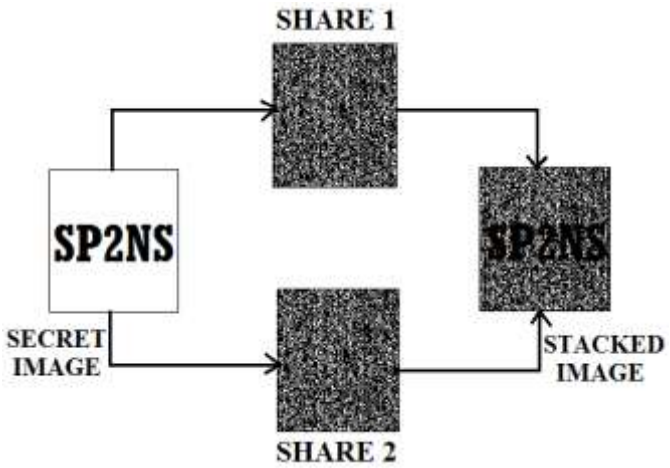

Figure -3: Visual Cryptography

5. CONCLUSIONS

Elections are conducted in such a way that the voters must be present at the voting site to cast his/her vote. This will decrease the participation of the voters. Online voting makes use of the internet to cast the vote. The main aim of it is to increase voter's participation. Online voting for corporate companies facilitates to conduct elections through which the stakeholders can choose their board of directors. By using 2 out of 2 visual cryptography scheme in voting application increases security and authenticity. Voting can be done in easy and efficient manner. The proposed system provides 2- way security. Employee can login only if correct id and password is entered. Employee can vote only if the two shares are valid. Only once a person can cast his/her vote and the results are displayed immediately. Visual cryptography in voting application enables security and authenticity which enables secure and easy-to-use interface to users.

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