E-Voting System Using QR Code and Mobile OTP Based on Android Platform for Modern Individuals

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Abstract—The advancement in the mobile devices, wireless and web technologies given rise to the new application that will make the voting process very easy and efficient. The e-voting promises the possibility of convenient, easy and safe way to capture and count the votes in an election. This project provides the specification and requirements for e-voting using an Android platform. The e-voting means the voting process in election by using electronic devices. The platform is used to develop an e-voting application. Security is the main factor while casting the vote electronically. The origin of the security issues happened was due to not only outsiders such as voters and attackers but also insiders such as system developers and administrators. These errors caused the voting system crashed. To eliminate threat of phishing and to confirm user identity, QR-code which would be scanned by user’s mobile device can be used and weakness of traditional password based system can be improved by one time password (OTP) which can be calculated by user transaction information and data unique at user side like IMEI number of the user mobile device.

Key words: e-mail, e-voting, One Time Password (OTP), Quick Response (QR) Code, Visual-Cryptography

I. INTRODUCTION

E-Voting greatly reduces direct human control and influence in voting process. This provides an opportunity for solving some old electoral problems but also introducing whole range of new concern. The e-voting system provides a voting service that allows people to vote from any poll site in the country electronically. This system includes legal, regulatory, sociological and behavioral aspects of the current voting system, while adding convenience and more secure environment to voting process. Technology upgrades in election are always challenging projects that require careful, deliberation and planning. Introducing e-voting is probably most difficult upgrade as this technology touches the core of the entire electoral process- the casting and counting of votes.

II. SYSTEM DESIGN ARCHITECTURE

We are introducing three new factors for secure user authentication such as,
(1) Mobile OTP
(2) Session Password
(3) OR codes

III. ALGORITHMS

This voting system comprises of following components and algorithms for the welfare of e-voting system:
- RGB Separation
- Thresholding Algorithm
- Visual Cryptography
- Secure Hash Algorithm

A. RGB Separation:
(1) Pixels are stored as Integers. The integers can be 8-bit, 24-bit or 32-bit depending on the image type.
(2) The 24 bit color images contain 8 bits each for Red, Green And Blue color values and 32 bit images have an additional transparency channel.
(3) Extract 8 bit RGB from 24 bit image.
   \[ b = \text{pix} \& 0xff; \]
   \[ g = (\text{pix} >> 8) \& 0xff; \]
   \[ r = (\text{pix} >> 16) \& 0xff; \]
1) **RGB Extraction:**
1. Red, Green and Blue colors are separated from a 24-bit color image by shifting green color with 8 bits and red color with 16 bits.
2. Extract 8 bit RGB from 24 bit image.
   
   ```plaintext
   b = pix & 0xff;
   g = (pix >> 8) & 0xff;
   r = (pix >> 16) & 0xff;
   ```

B. **Thresholding Algorithm:**
It is used for separation of foreground and background image. We assign average value to Grayscaling as, \( gs = \frac{r+g+b}{3} \) and then assign \( r=g=b=gs \). Pixel value ranges 0-255 so, we assign threshold value as 124 and compare it with Grayscale value. If \( th \geq 124 \) then assign pixel as black, else assign pixel as white.

C. **Visual Cryptography:**
(1) In this stage we will generate the 2D matrix.
(2) For each pixel we will create a random matrix for Share1 and check the pixel value.
(3) If this is the matrix and the pixel value is 1 then the swapped matrix will be-

\[
\begin{pmatrix}
1 & 1 \\
0 & 1
\end{pmatrix}
\]

(4) If this is the matrix and the pixel value is 1 then the swapped matrix will be-

\[
\begin{pmatrix}
1 & 1 \\
1 & 0
\end{pmatrix}
\]

\[
\text{Fig 3.3: Visual Cryptography}
\]
(5) The two matrix of share1 and share2 are compared and original image is formed.
(6) If we see the matrix of share 2 is swapped one we will write the pixel value as 1 or else we will write it as 0.

D. **Secure Hash Algorithm:**
It is a 16 bit hash function which resembles MD-5 algorithm. It is one of the cryptographic hash function. A cryptographic hash is like a signature for a text or data file. SHA-256 bit generates an almost unique, fixed size 256 bit hash function. It is use for digital signature standard.

IV. **Conclusion**
Now a days, use of e-Voting application are increased. Security is an important issue for handling such services. Current system provide security card based facility to authenticate user but this is not much more secure and will not be available for any time or situation. To overcome such type of issues we propose online e-Voting authentication system using QR-code and OTP.

Using our system bogus voting will be reduced certain extent. It provides security, confidentiality and transparency. It also cost effective. For using this system user must have an Android device and internet connection. This system is useful for secure voting and provide mobility to users by Android Platform.

ACKNOWLEDGEMENT
We were guided by Prof. D.D.Pukale Head of Computer Department in Bharati Vidyapeeth’s College of Engineering for Women, Pune.

Our sincere thanks to his support in the field of e-voting and Android technology was of great help in making our paper.

REFERENCES


