

E-Voting Using Face Detection and Recognition (FDR), One Time Password (OTP)

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Abstract: Face Detection and Recognition system (FDR) is used as an Authentication technique in online voting, which one of electronic is voting types. Web based voting allows the voter to vote from any place in state or out of state. The voter's image is captured and passed to a face detection algorithm which is used to detect his face from the image and save it as the first matching point. The voter's National identification card number is used to retrieve and return his saved photo from the database of the Supreme Council elections which is passed to the same detection algorithm to detect face from it and save it as second matching point. The two matching points are used by a matching algorithm to check whether they are identical or not. If the results of the matching algorithm are two point match then checks whether this person has the right to vote or not. If he has right to vote then a voting form is presented to him. Second level authentication is done using One Time Password (OTP) principle. The OTP principle emphasizes that each time the user tries to log on, the algorithm produces pseudorandom output, thus improving the security. The result shows that the proposed algorithm capable of finding over 90% of the faces in database and allows their voter to vote in approximately 58 seconds.

Keywords: Face detection and Recognition, One Time Password (Two- Factor authentication).

1. Introduction

Considering how far e-commerce has come, why can't people vote online in national and state elections with the same security and convenience that they enjoy while banking or buying books? Online voting system is a voting system in which the election data is recorded, stored and processed primarily as digital information and it needs to address, obtain, mark, deliver, and count ballots via computer. Therefore voter identification and authentication techniques are essential for more secure platform mechanisms to overcome vulnerabilities of the client used by the voter to cast her vote.

Web based voting allows the voter to vote from any place in state or out of state. Several voter identification and authentication techniques were introduced to secure voting platforms and overcome fake voting.

Some of these techniques are: Highly Secure Online Voting System with Multi Security using Biometric and Steganography But its cost was high and it was not highly secure. In the proposed system a Face Detection and Recognition system (FDR) and One Time Password (OTP) is used as an Authentication technique in online voting. FDR (Face Detection and Recognition) is used as an Authentication technique in online voting. FDR system detects the face from an image captured using a webcam and recognize face from e-voting database and check if the two images match. If a match accrues, then verify that the law and roles of voting are not violated then allow him to vote. Second level authentication is done using One Time Password (OTP) principle. The OTP principle emphasizes that each time the user tries to log on, the algorithm produces pseudorandom output, thus improving the security. An OTP is a password that is only valid for a single login session or transaction. It uses strong passwords produced from strong hash functions. Moreover, reusing passwords is restricted by encoding passwords to be used one time only.

Need of E-Voting

The benefits of developing electronic voting system are:

- i. On line voting allow voter to vote 24 hour per day and 7 day per week also allow him to vote from anywhere in his state or out of state.
- ii. saving on paper ballot printing
- iii. Transportation and storage
- iv. counting staff and
- v. fast vote counting with results in 2-3 hours as opposed to 30-40 hours
- vi. Convenience of voting from any place.

With the appearance of computers with programmable platform, it is possible the development of application for worldwide popular participation by the digital vote. It is revealed that there is a raising interest for voting through social networking tools like Facebook or Twitter. It is seen that a public holiday on voting day often results in people hanging out rather than going for a vote. Online voting gives the convenience of voting from an place at any time, thus helping the above problem.

It's believed that the online voting process give some decision power to the citizens, which can actuate directly on decisions of their concerns. The voting process also can give ways for numerical information surveillance about social phenomena.

2. Algorithms

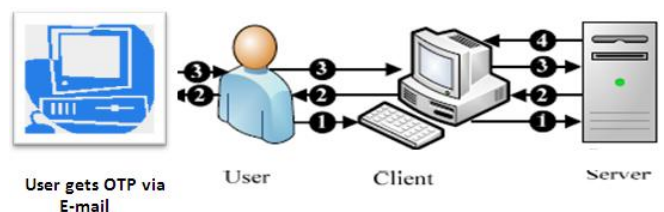


Figure 1: One Time Password

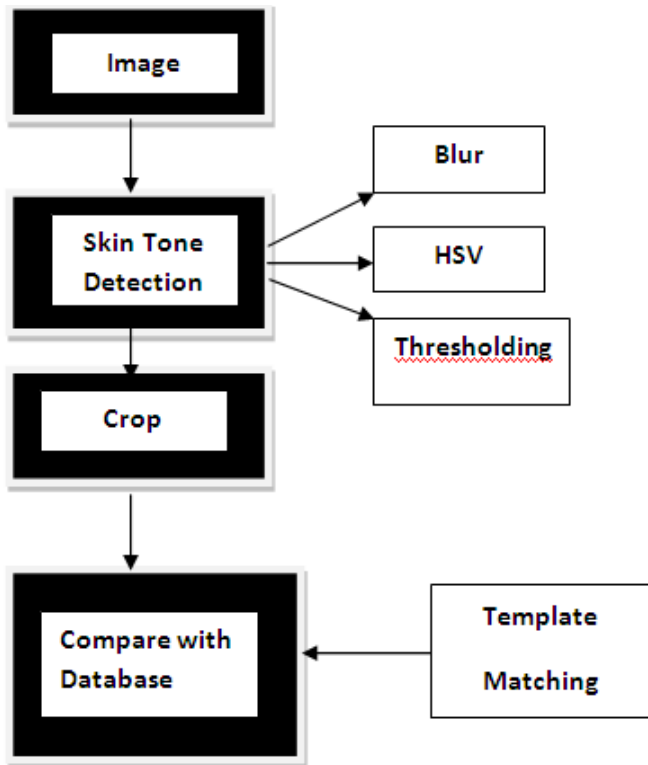


Figure 2: Face Detection and Recognition

A. SHA1 Algorithm

SHA1 stands for “Secure Hashing Algorithm”. SHA1 outputs a 160bit digest of any sized file or input. In construction it is similar to the previous MD4 and MD5 hash functions, in fact sharing some of the initial hash values. It uses a 512 bit block size and has a maximum message size of 2^{64} -1 bits.

B. Algorithm Description

Padding
 Pad the message with a single one followed by zeroes until the final block has 448 bits.
 Append the size of the original message as an unsigned 64 bit integer.
 Initialize the 5 hash blocks (h0, h1, h2, h3, h4) to the specific constants defined in the SHA1 standard.
 Hash (for each 512bit Block)
 Allocate an 80 word array for the message schedule
 Set the first 16 words to be the 512bit block split into 16 words.
 The rest of the words are generated using the following algorithm
 $word[i+3]$
 $XOR\ word[i+8]$
 $XOR\ word[i+14]$
 $XOR\ word[i+16]$
 then
 Rotated 1 bit to the left.
 Loop 80 times doing the following. (Shown in Image1)
 Calculate $SHAfunction()$ and the constant K (these are based on the current round number.
 $e=d$
 $d=c$
 $c=b$ (rotated left 30)
 $b=a$

$a = a$ (rotated left 5) + $SHAfunction()$ + $e + k + word[i]$
 Add a, b, c, d and e to the hash output.
 Output the concatenation (h_0, h_1, h_2, h_3, h_4) which is the message digest.

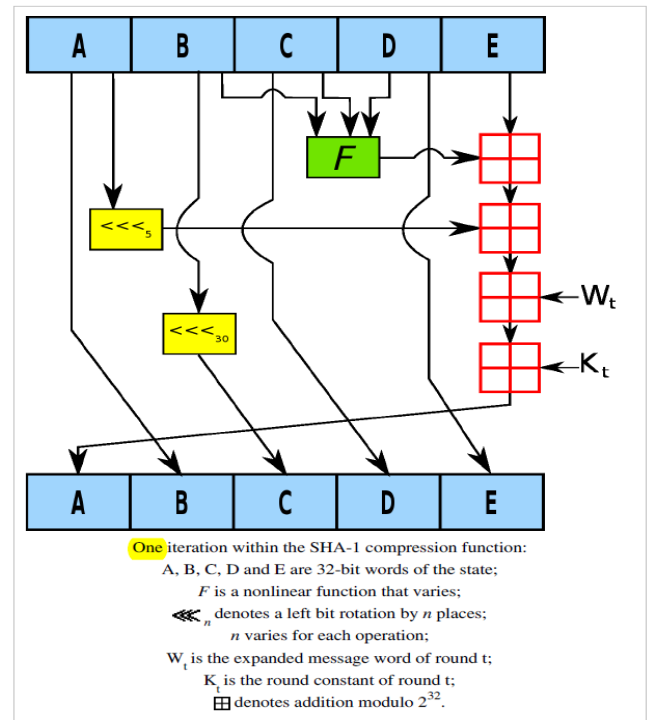


Figure 2: SHA1 Algorithm

3. System Design

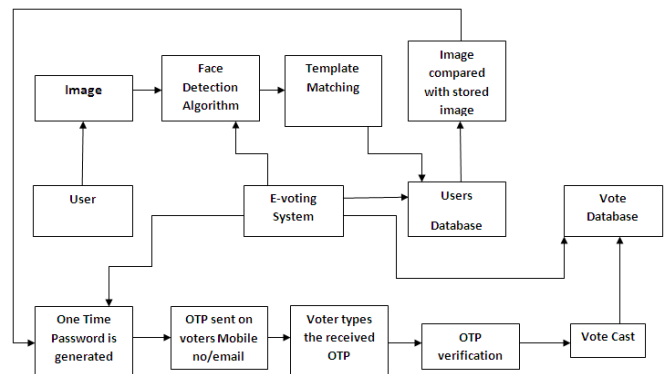


Figure 3: System Architecture

Admin application Client Application

- Client Registration Login
- Parties Management Select party
- Candidate Registration Face Recognition
- View votes OTP
- Language Translation Vote
- Logout

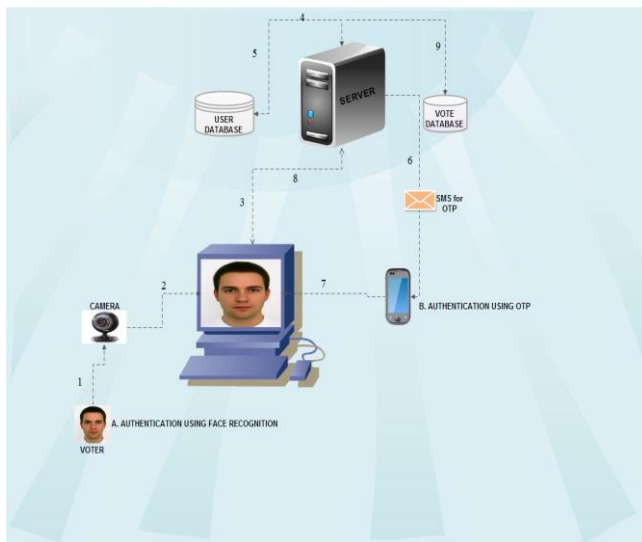


Figure 4: System Flow Diagram

C. System Flow

The voter's image is captured using a webcam. This image is used as an input to the face detection algorithm. This image is sent to the server side for verifying the user. This is achieved by template matching where the image received from the user side is compared with the image stored in user database at the time of registration. Once the user is verified, a One Time Password is generated and sent to the user's email id/sms on his cell phone. After the user enters the OTP, he can cast his vote. The vote cast by him is then stored in the database and is taken for tallying purpose after the deadline for voting process.

D. Advantages

Saved Ballot Templates eliminate the need to configure elections from scratch. Just do it once, then save that ballot configuration, and in subsequent years, specify only the names of the candidates.

Reduced costs are enjoyed when the expenses of printing, mailing and tabulating paper ballots are lessened or even eliminated entirely from the election process.

Email Solicitation adds value by soliciting an email address from voters without one already on record and then notifying you about the newly-acquired email so it may be added to your master records.

Email Reminders help increase voter participation by sending reminders to voters who've not voted and providing them with a link straight to the online ballot.

Email Validation brings added value to your online election by inspecting your voters' email addresses and notifying you of any that are not properly formatted.

Ballot Scrubbing ensures no ballot is spoiled due to anything not in compliance with your voting rules by notifying voters, in plain-language, about how to ensure their ballot conforms to those rules.

Ballot Shuffling randomly orders the candidates' names on each request of the ballot so all candidates get a fair chance at prime name placement on the ballot.

On-demand Paper Ballots simplify hybrid elections by allowing an election administrator to generate a voter-specific paper ballot that honors all the election settings just as web ballots do.

Automated Tallying removes human fallibility from the tabulation process and makes your election results available within seconds of the close of the election.

Comprehensive Reporting instantly provides you with informative day-by-day statistics about your election beyond just who won, demonstrated at the [Sample Election Results](#) page.

Archived Election Results means all previous election results are readily available at your account which saves you from having to dig through a file cabinet to find results from previous elections.

Ability to correct mistakes allows voters to go back and correct any mistakes before final submission of their ballot. Once a ballot has been submitted however, it is final and cannot be altered.

E. Disadvantages

The 'Digital Divide' Internet voting skeptics point out that poor and minority voters have less access to computers and the Internet and so would be less likely to benefit from online voting. Expanding access for well-off voters could increase their participation while doing nothing to improve access for low-income voters who already have little influence in the political process. This "digital divide" has narrowed considerably since the 1990s, however, and those without home Internet can often get access in workplaces or public libraries.

Election Security: Online voting's technical vulnerabilities could also undermine the integrity and credibility of election systems. When hackers can break into high-security websites or cripple entire computer networks with Denial of Service attacks, voters might not trust reported results. In an influential 2000 report on Internet voting, California's secretary of state argued that "the accuracy of the vote count should be unassailable" but identified several concerns, including ballot secrecy and the need for systems immune to tampering.

Electronic voting machines and vote-by-mail have vulnerabilities of their own, however, and for some voters, the benefits of online voting may already outweigh the risks. The paper ballots of military and overseas voters often arrive past the deadline, leaving them with no vote at all. Arizona and some counties in West Virginia already allow those groups to vote online, and experiments continue elsewhere.

F. Application

The same system can be used where election is conducted like banks, school, and companies (to select directors or board members).

4. Results

Our aim is to develop an e-voting system using Face Detection and Recognition system (FDR) and One Time Password (OTP) as an authentication technique in online voting. Thus security increases as there are two levels of authentication. The result shows that the proposed algorithm capable of finding over 90% of the faces in database and allows their voter to vote efficiently.

5. Conclusion

Developing an e-voting system using Face Detection and Recognition system (FDR) and One Time Password (OTP) as an authentication technique in online voting. Thus security increases as there are two levels of authentication. Thus we conclude that an e-voting system that can serve as a revision tool in real time that will facilitate the voters to vote efficiently and effortlessly.

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