

Online E-Voting System using Blockchain Technology

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ABSTRACT

India is the world's largest democracy with over one billion in population; India has over 668 million voters and 543 parliamentary constituencies. India is the largest democracy in the world. Voting is the bridge of government and governance. In recent years, the technology used in the voting process has been given a renewed focus. There are many security problems in the current voting system, and even simple security features are difficult to prove. There are many concerns about a voting system that can be proven right. There are some reasons why an electronic system is being used by the government to increase elections and reduce electoral expenses. There is still some scope for electronic voting systems, because there is no way to identify whether or not the user is authentic and to secure electronic voting machines from misconceptions by the electronic voting scheme. In order to increase safety and transparency between the users, the proposed system will develop a compatible high security voting machine with the help of Block-chain technology.

Keywords: Electronic Voting System, Voter ID, Security, Block Chain, Vote.

I. INTRODUCTION

Voting, whether traditional ballot based or electronic voting (e-voting), is what modern democracies are built upon. In recent years' voter apathy has been increasing, especially among the younger computer/tech savvy generation. E-voting is pushed as a potential solution to attract young voters. For a robust e-voting scheme, a number of functional and security requirements are specified including transparency, accuracy, auditability, system and data integrity, secrecy / privacy, availability, and

distribution of authority. A distributed network consisting of a large number of interconnected nodes supports Block-chain technology. Each of these nodes has their own copy of the distributed ledger that contains the full history of all transactions the network has processed. If the majority of the nodes agree, they accept a transaction. This network allows users to remain anonymous. A basic analysis of the block-chain technology suggests that it is a suitable basis for e voting and it could have the potential to make e-voting more acceptable and reliable.

II. LITERATURE SURVEY

This paper [1], proposed secure voting system with fast voting results through RFID based biometric voting system. In this paper, there are two verification steps involved. First, RFID tag is used which contains the verification data, which is already stored in LPC 2148. Second, the Fingerprint scanner is used to check whether the RFID is belonging that particular person or not. The drawback of this paper is cost maximized due to use of RFID method.

In this paper [2], used of Aadhaar card provided by UIDAI with QR code present in it. Online instead of offline mode and storing the voting data to secured online server. Results can be displayed by admin after entering user id and password.

The proposed method [3] is to build a Smart voting system using fingerprint recognition technology that allows any voter in INDIA to cast the vote to their respective constituency from anywhere in INDIA by going to their nearest voting booth in the place of stay. In addition, to develop a secure smart voting system based on biometric recognition. Provides the voter to vote from any region within India to their Residential Constituency from the nearest Voting Booth with a secure voting process without neglecting to vote.

This paper [4], proposes protected voting system to avoid the unlawful voting. The authentication of an individual is made using biometric and capability of the voter is affirmed using the Aadhaar. In this system, the data stored in the Aadhaar card act main criteria for authentication and conformation. The security is provided through biometrics such as fingerprint. The fingerprint information stored in the Aadhaar is taken as the reference and used for authentication at the time of voting.

Basic electronic machine [5] which is used nowadays has some laggings like multiple vote casting from one member and invalidity of votes are checked automatically. To reduce these disadvantages, the smart automatically processed and fingerprints are used to reduce multiple vote casting in simple way.

This paper [6] has shown the possibility of establishing E-Voting protocol based on public-key encryption cryptosystem. The security of the proposed E-Voting depends on RSA public key encryption protocol. It allows the voter to vote from his/her own personal computer (PC) without any extra cost and effort. This protocol is proposed to replace the unreliable previous voting system, since voters feel justifiably confident that their votes will be counted.

This system [7] provides security from all type of attacks, when vote is travelling from voting client to voting server from their experimentation. These attacks include security threats from passive as well as active intruder. For authentication of voter instead of USERNAME, if we can use thumb impression of voter or capture photo of his/her face and compare it with photo stored in our database, it will be more secure.

In this paper [8], a block-chain-based voting system. It needs time to popularize block-chain for a voting system as it is a novel idea and voting itself is a crucial matter in a democratic country.

The proposed [9] model is more secure than other models and it is suitable for use in major elections on a large scale. After casting a vote with NCVVS system, the voter receives a confirmation email containing the ballot fingerprint (and also the fingerprint of the election) calculated by standard hash function SHA (256).

The proposed work [10] is based on the block-chain technology, which remove all the threats from the

communication link. It is a decentralized system, contain hashing and encryption concept for providing the security.

III. PROPOSED METHODOLOGY

In our system Block Chain Concepts are applied to Online Voting System when we are developing a Smart E-voting system by taking advantage of block Chain concepts with web interface.

- ECC (elliptic curve cryptography) Algorithm

Elliptic Curve Cryptography (ECC) is an approach to public-key cryptography, based on the algebraic structure of elliptic curves over finite fields.

ECC requires a smaller key as compared to non-ECC cryptography to provide equivalent security (a 256-bit ECC security have an equivalent security attained by 3072-bit RSA cryptograpy).

For a better understanding of Elliptic Curve Cryptography, it is very important to understand the basics of Elliptic Curve.

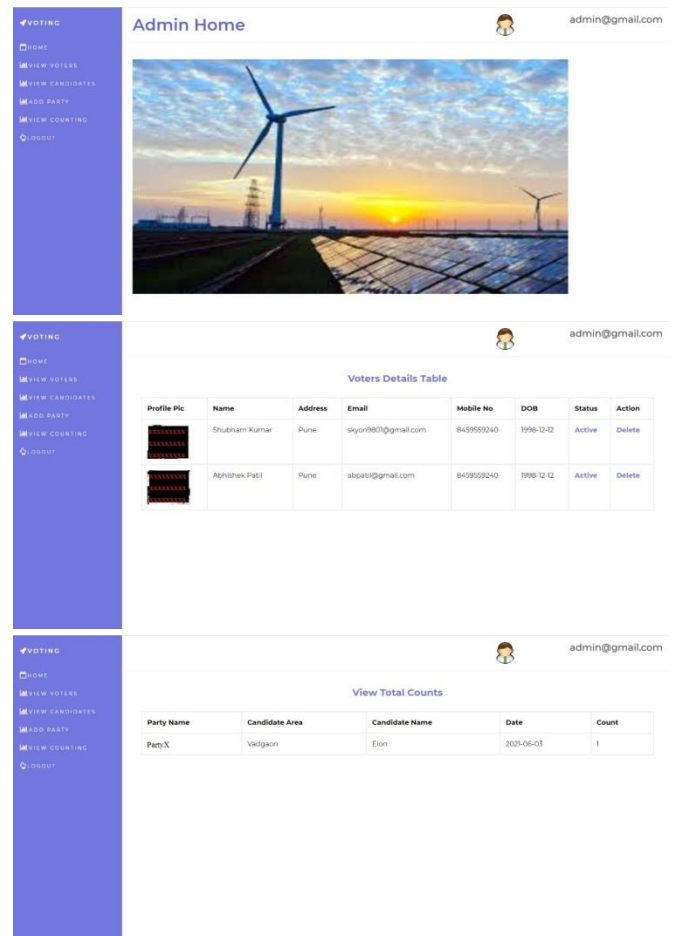
An elliptic curve is a planar algebraic curve defined by an equation of the form.

IV. RESULTS & DISCUSSION

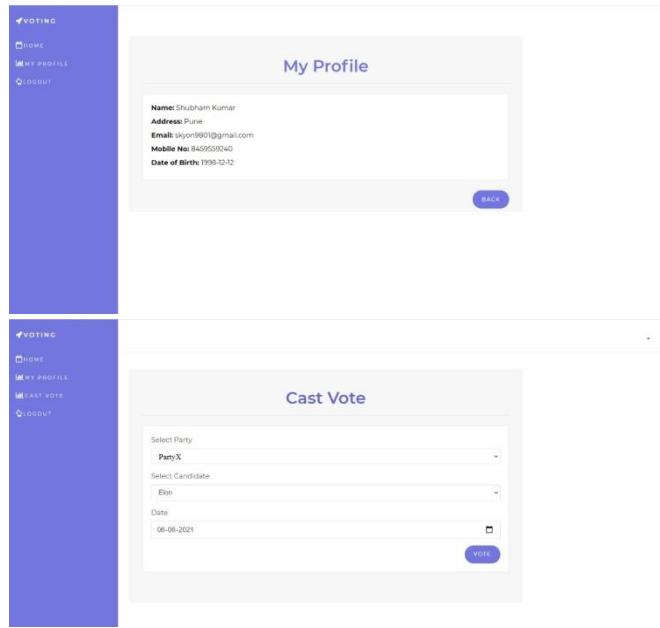
Experiments are done by a personal computer with a configuration: Intel (R) Core (TM) i3-2120 CPU @ 3.30GHz, 4GB memory, Windows 7, MySQL 5.1 backend database and Jdk 1.8. The application is web application used tool for design code in Eclipse and execute on Tomcat server.



The Home Page is very user friendly and can be easily understood by any average adult irrespective to his/her background. The Home Page acts as a common platform for the Voter, Candidate as well as the Admin. The voter and candidate can go ahead to their respective sections and register themselves accordingly, only to be verified and authorized by the admin from his login.



The Admin here acts as a supervisor as well as an arbitrator in the entire process. He/She is authorized to verify and authorize the voter as well as the candidate, only post authorization by the admin they are entitled to participate in the election process. The admin can also count the votes but he/she cannot control the voting process from his/her side neither he/she can trace back a particular vote to its voter.



The Voter once registered and authorized by the admin, can log into the system and view his/her details and cast his right: The Vote. While casting the vote he/she has 3 parameters to fill-up namely: Select Party (The Party he/she wants to vote), Select Candidate (The Candidate he/she wants to vote), and Date (The Date he/she is voting on).

- Overall System Execution

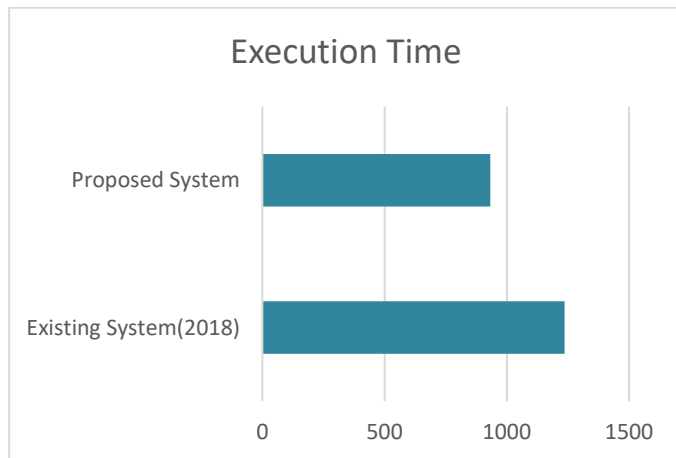


Figure 1: Overall system execution graph

Existing System (2018)	Proposed System
1236ms	932ms

Table 1: Overall system execution table

V. CONCLUSION

This paper described, an electronic Voting system for small to medium sized Internet-based public opinion systems that provides privacy of vote, voter’s authentication, auditability, security, double-voting prevention, fairness voting device from manipulating the authenticated voters voting choices.

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VII. REFERENCES

- [1]. J.Deepika, S.Kalaiselvi, S.Mahalakshmi, S.Agnes Shifani, “Smart Electronic Voting System Based On Biometric Identification-Survey”, International Conference on Science Technology Engineering Management (ICONSTEM).
- [2]. Ravindra Mishra, Shildarshi Bagde, Tushar Sukhdeve, J. Shelke, “Review on Aadhaar Based Voting System using Biometric Scanner”, International Research Journal of Engineering and Technology(IRJET).
- [3]. Girish H S, Gowtham R, Harsha K N, Manjunatha B, “Smart Voting System”, International Research Journal of Engineering and Technology (IRJET).
- [4]. K. Lakshmi, R. Karthikamani, N. Divya “Aadhar Card based smart e-voting system”, International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249 8958, Volume-8, Issue-2S, December 2018.

- [5]. G.Saranya, R.Mahalakshmi, J.Ramprabu, “Smart Electronic Voting Machine surveillance”, International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249 8958, Volume-8, Issue- 2S, December 2018.
- [6]. Ashish Singh, Kakali Chatterjee, SecEVS: Secure Electronic Voting System Using Blockchain Technology, International Conference on Computing, Power and Communication Technologies (GUCON) Galgotias University, Greater Noida, UP, India. Sep 28-29, 2018.
- [7]. Cosmas Krisna Adiputra, Rikard Hjort, and Hiroyuki Sato, A Proposal of Blockchain-based Electronic Voting System, Second World Conference on Smart Trends in Systems, Security and Sustainability.
- [8]. Jena Catherine Bel.D, Savithra.K, Divya.M, A Secure Approach for E-Voting Using Encryption and Digital Signature, International Journal of Engineering Development and Research.
- [9]. Abhijit J. Patankar, Kotrappa Sirbi, Kshama V. Kulhalli, “Preservation of Privacy using Multidimensional K-Anonymity Method for Non Relational Data”, International Journal of Recent Technology and Engineering (IJRTE) ISSN: 2277-3878, Volume-8 Issue-2S10, September 2019.
- [10]. Ashraf Darwish and Maged M El-Gendy, A New Cryptographic Voting Verifiable Scheme for E-Voting System Based on Bit Commitment and Blind Signature, International Journal of Swarm Intelligence and Evolutionary Computation.