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E-Voting System using Blockchain Technology

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Abstract-Since then, there have been several forms of voting. Most countries still use paper ballots to cast their votes. Electronic voting methods have just become widespread in the previous 10 years and still have several unsolved issues. Security, legitimacy, transparency, openness, dependability, and usefulness are the most pressing concerns with electronic voting. This is a field in which Estonia is a pioneer and a leader. However, when it comes to blockchain, the options are limited. It is possible to address all of the issues listed with the help of blockchain technology, which also provides advantages like as immutability and decentralisation. For e-voting, the main issues with blockchain technology are the lack of testing and comparison, as well as the concentrate on a single topic. A blockchain-based electronic voting system that can be used for any type of vote is described in this paper. All procedures may be completed on the blockchain. Decentralization ensures that once voting begins, the platform is completely independent and cannot influence the outcome of the vote. Homomorphic encryption ensures that the voters' identities are protected. Our solution was tested and compared on three different blockchains. The findings show that both public and private blockchains are available at a relatively low speed. Because of the homomorphic encryption used to protect voter data, we've developed a new approach that completely decentralises the management of the e-voting platform using blockchains.

Keywords— Blockchain Technology, E-Voting, Security, Transparency.

I. INTRODUCTION

There is still a long way to go in the development of electronic voting technologies. In addition to its recent advances, we selected this industry since there aren't many solutions to e-voting difficulties. E-Government development is also becoming more popular these days. However, if key functions like voting are not digitised for residents, such a system is ineffective. [1] "E-voting" is one of the most crucial public domains that blockchain technology may revolutionize. With e-voting, new challenges must be dealt with Hand in Hand. In order to protect elections, for example, they must be at least as safe as traditional voting methods. As a result, we set out to design safe elections in which voters need not be concerned about someone abusing the voting system. In the last several years, the term "blockchain" has been synonymous with a secure online example of technology. Our blockchain-based evoting technology handles all aspects of the voting process. One of the main advantages of this system is that it doesn't require the centralised body that created it to have faith. This authority has no power to alter the results of our system. E-lack voting's of transparency, which can lead to a lack of trust in the system, is another problem[2]. There are many ways to solve this problem, but one of the most effective is the use of blockchain technology. This technology is far superior to the traditional e-voting platform without a blockchain in terms of security.

II. RELATEDWORKS

There is now an IOT-based transfer mechanism in place that makes it easy for EVMs to send data to the blockchain network's server. EVM's onboard controller, the Raspberry Pi, is utilised to achieve this.A lot of hardware (the Raspberry Pi) is needed to accomplish this method.The primary goal of our project is to create a blockchain-based e-voting platform that can be used for any sort of vote. All procedures may be completed on the blockchain. As soon as the voting period has begun, the platform is entirely self-governed and decentralised, and no one can influence the outcome.

[1] N. Kshetri and J. Voas. Blockchain-enabled e-voting (BEV) might help avoid election fraud by boosting voter access. Voting takes place anonymously through computer or smartphone for those who are eligible. Encrypted keys and personal IDs are tamper-proof in BEV's encryption system. This article discusses several BEV initiatives and explores the method's potential benefits and drawbacks. Key words: electronic voting in cities, blockchain, and urban areas The following are some of the most often used keywords: Blockchain technology has the potential to disrupt a variety of public processes, including electronic voting. Electronic voting (BEV) has a simple concept. Using a digital money analogy, BEV provides each voter with a "wallet" and a user credential. Each voter is given a "coin" that symbolises one vote, which they may cast. The currency of the elector is transferred to

the candidate's wallet when he or she casts a vote. The coin of a voter may only be spent once. Prior to a certain deadline, voters may, however, go back and make changes to their ballot. Blockchains may be able to handle two of today's most pressing issues: voter eligibility and election fraud. This is the gist of what we're working on. Voting takes place anonymously through computer or smartphone for those who are eligible. Encrypted keys and tamper-proof IDs are used by BEV. For example, Voatz's mobile e-voting platform makes use of smart biometrics and real-time identity verification. There is a permanent and unchangeable record of every ballot cast by a single person. Using a peer-to-peer consensus network on the ledger, it is impossible for a bad player to engage in damaging behaviour. Before fresh blocks to damage the network, hackers would need to successfully hijack the majority of them (files containing transaction information). The audit trail blockchain ensures that votes have not been tampered with or removed, and that no more fraudulent or illegal votes have been cast in their place. In a nutshell, blockchains allow for the creation of audit trails that are immune to tampering. In this article, we examine the method's potential benefits and drawbacks. a few recent examples The initial practical implementations of BEV were for non-binding and advisory votes that were not intended to be legally binding. Subnational Voatz tested its mobile technology, for example, in student government elections, church, non-profit, and union vote, as well as political party events, in the early months of 2018. The method was also used in municipal meetings in Massachusetts. Over two million people in Russia have signed up for the city of Moscow's Active Citizen project since it was launched in 2014. Thousands of gatherings take place in Moscow's districts every year. More than 92 million votes were cast in 3450 polls conducted via a central Oracle database on a wide range of issues, including the colour of a new sports stadium and whether or not to install or pay a doorkeeper for driveway entry gates. It's possible to tailor blockchains for this purpose even if these cases don't apply.

[2] M. Pawlak, J. Guziur, and A. Poniszewska-Mara nda,Electronic voting is based on a variety of ideas and methodologies across the globe. Each has its own set of benefits and drawbacks. One of the most important and prevalent problems is the absence of audit capabilities and system verification processes. As Blockchain technology has gained popularity lately, this problem can be overcome. Auditable Blockchain Voting System discusses the electronic voting procedures and the components of an audit-capable supervised Internet voting system in this study. To do this, the ABVS relies on blockchain technology and a paper audit trail that has been approved by the voting population.

[3] B. Singhal, G. Dhameja, and P. S. PandaYou should be familiar with Blockchain's many flavours and fundamental uses, as well as its cryptographic foundations. Developing unique solutions will be made easier with the knowledge of a few design elements.It is a guide for novices to understand the fundamentals of Blockchain from a technical perspective. As a result, you'll have a better grip on the different blockchain architectures and be more equipped to create custom solutions. methods, cryptography and distributed consensus-based systems are covered in the book. As you study these systems, you'll learn how to design business solutions for the next generation.

III. PROPOSED SYSTEM ARCHITECTURE

The suggested blockchain voting system takes account of all voting needs and is typically suitable for any election, e.g. president, student parliament, etc. The approach enables more round elections and uses a public blockchain preferable. The Public Blockchain can be substituted with alternative blockchain kinds, but every user must simply check the recorded data (votes). The user is any observer interested in the blockchain vote.In this proposed system we are using face recognition technique and OTP technique for depositing the vote.

ADVANTAGES

We identify three critical responsibilities in our proposed system: voting publisher, key authority and voting. These three roles may represent a firm, an organisation, or a user. The publisher of roles for voting and key powers might be grouped into a single job because they can be the same organisation.

Register New User

This module is used to add a new user to the system.It takes some details from user and stores into data base.

Admin Login

This user responsible to add new party and candidate details and can view party details and vote count. Admin login to system by using username as ‘admin’ and password as ‘admin’. In Admin login page, there are

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options to add Party Details, View Party Details, View Votes.Admin can manage all the data in system.Party Details and Votes data is stored in database.

User Login

This user has to signup with the application by using username as his ID and then upload his face photo which capture from webcam. After registering user can go for login which validate user id and after successful login user can go for cast vote module which execute following functionality. User having only one option to caste their vote. The vote casted details are stored in data base. Before casting vote they need to verify their identity through face recognition and one time password.

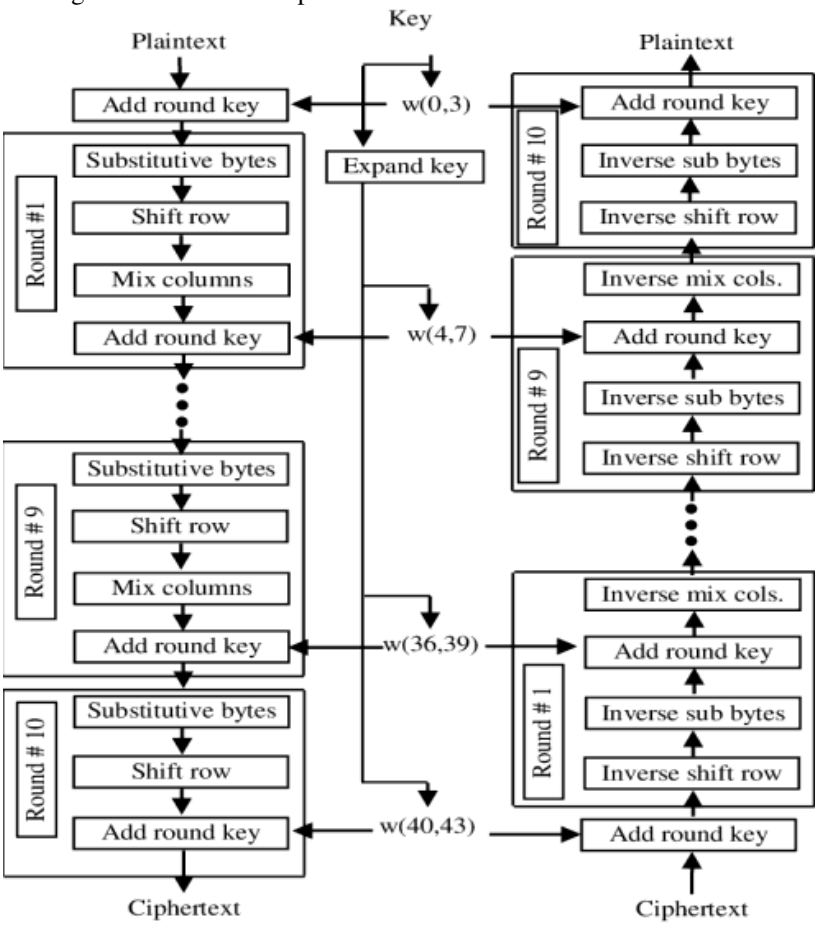

Fig.1 AES Algorithm (Encryption).

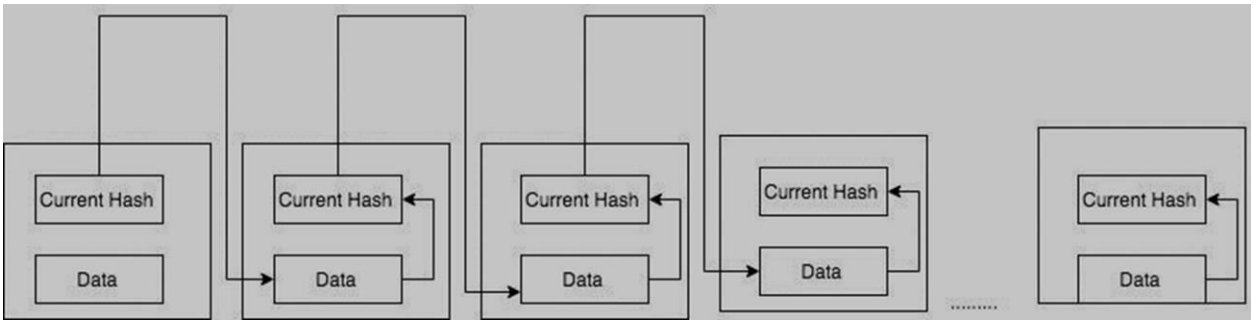

Fig. 2. Implementation of Blockchain using AES Algorithm

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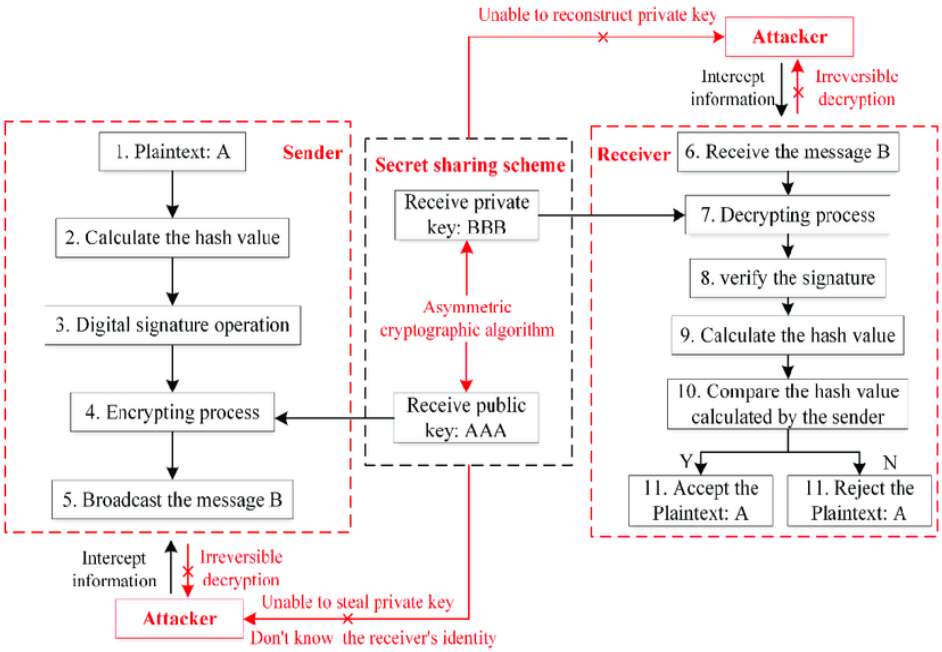

Fig.3. Proposed Methodology

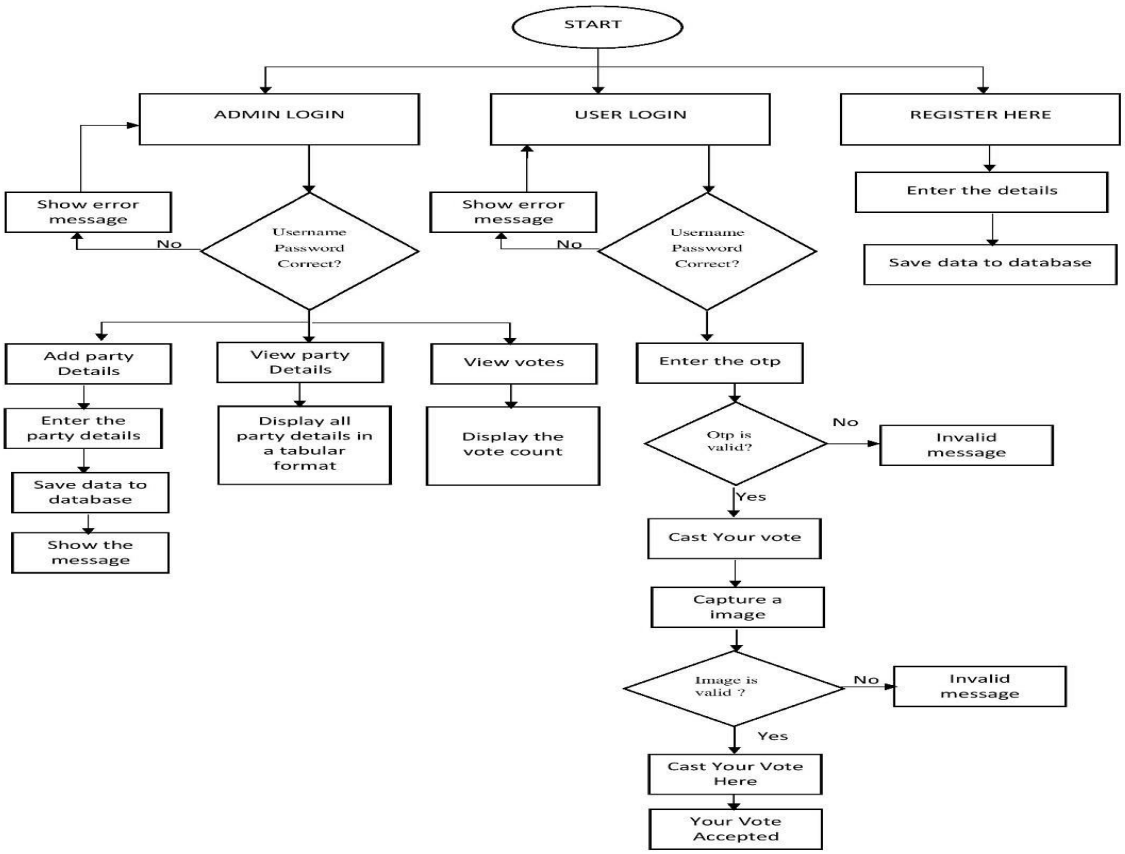

Fig. 4 Flow Chart

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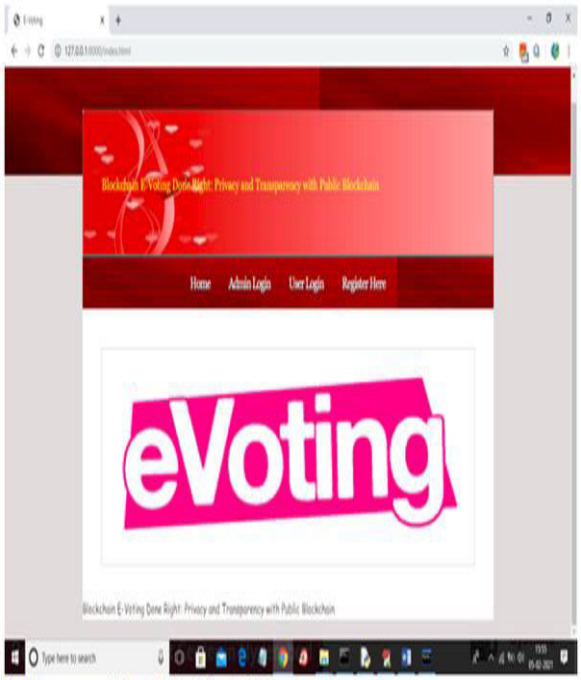
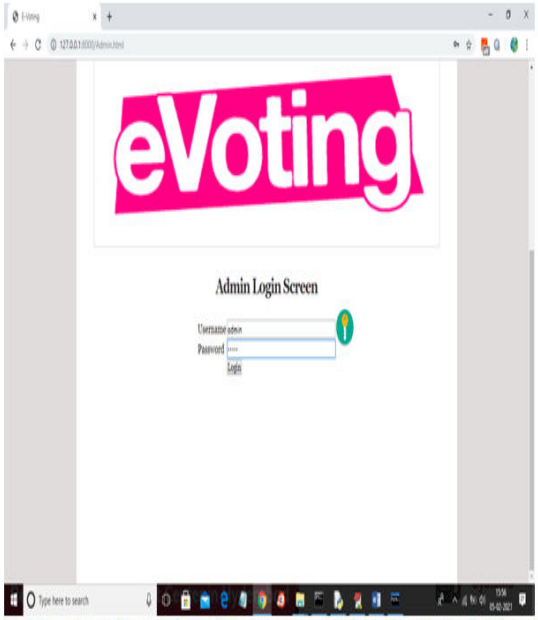
IV. RESULTS AND DISCUSSION

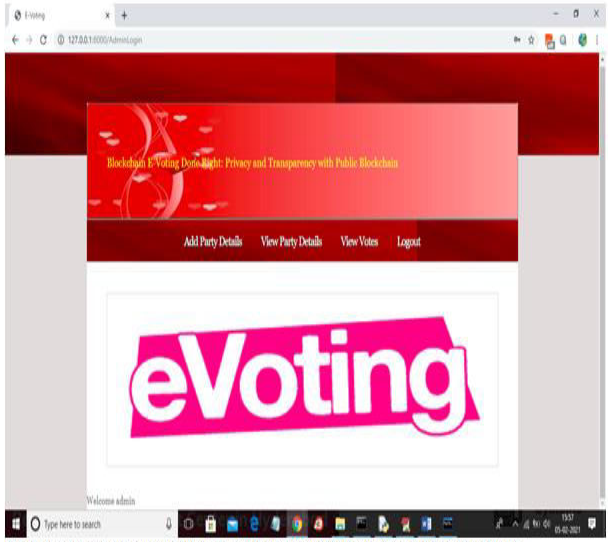
The sample results obtained after execution of implementation code is given below



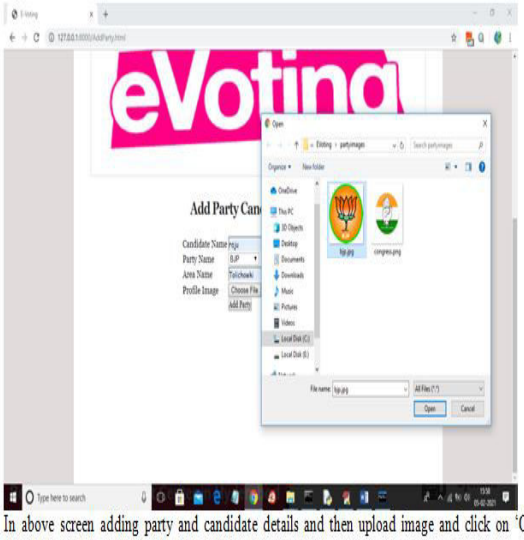
In above screen click on 'Admin Login' link to get below screen



In above screen login as admin by giving username as 'admin' and password as 'admin' and then click Login button to get below screen



In above screen admin can click on 'Add Party Details' link to add party details



In above screen adding party and candidate details and then upload image and click on 'Open' button then click on 'Add Party' button to add party details

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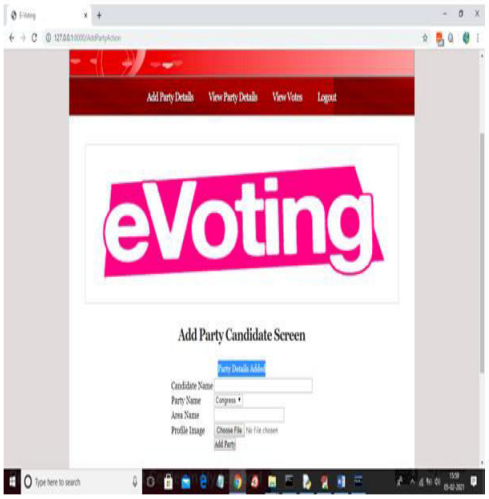
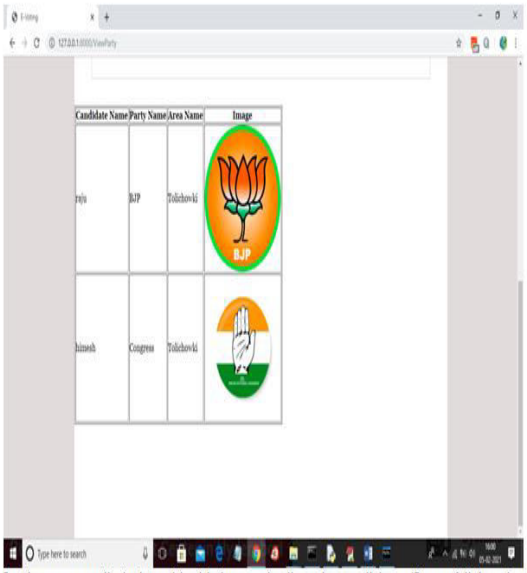
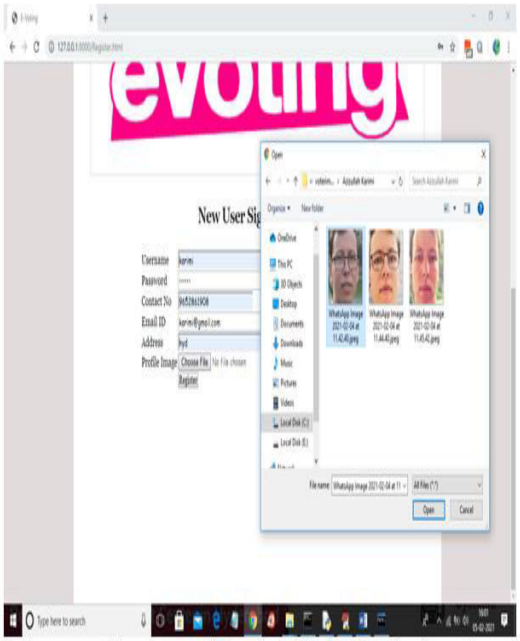


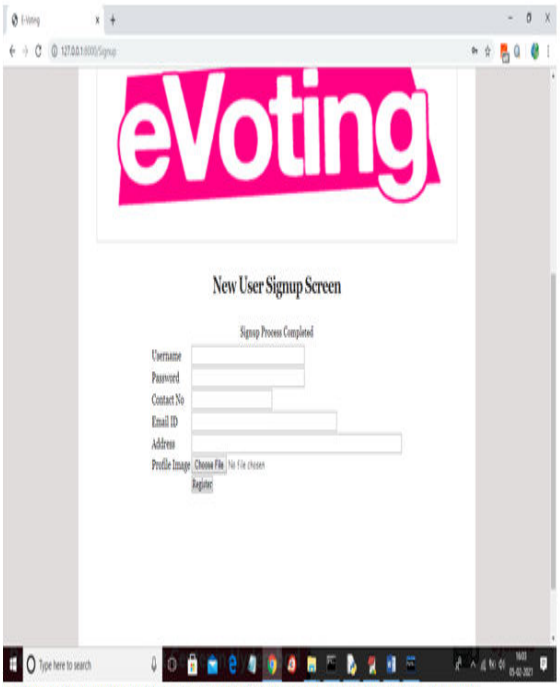
In above screen part details added and similarly you can add any number of party members and now click on 'View Party Details' link to get below screen



In above screen displaying add added party details and now click on 'Logout' link to logout as admin and then add new user



In above screen adding new user and then selecting his face photo taken from webcam and then click on 'Register' button to complete signup process. Here you have given images taken from phone but we need to capture from webcam for dataset as quality of webcam image and phone image vary and then problem comes in prediction.



In above screen signup process completed and now login as this user to cast vote

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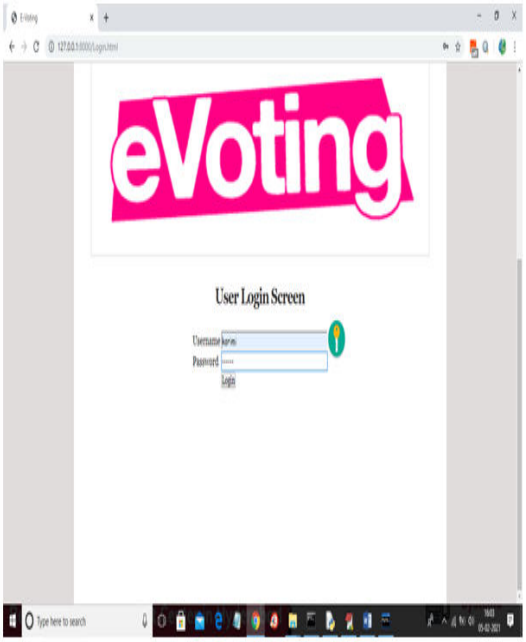
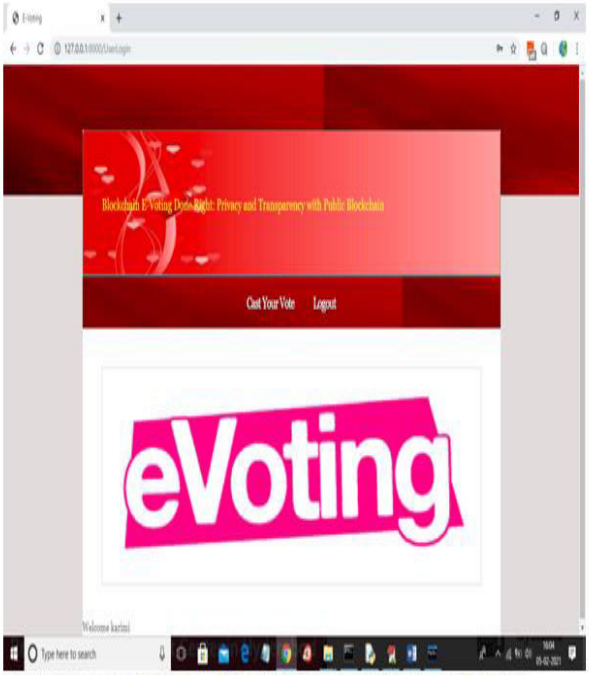
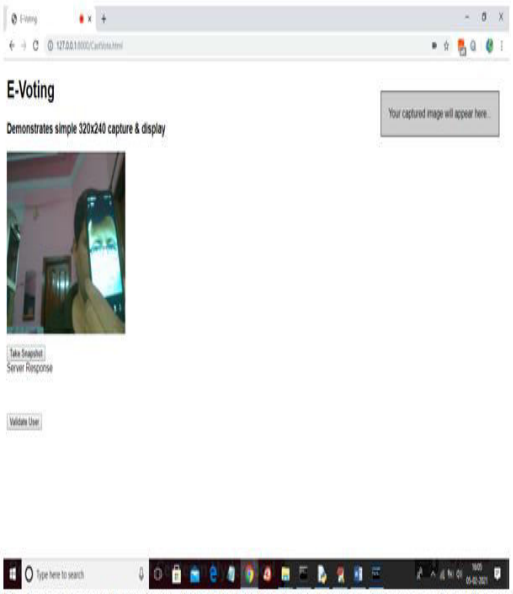


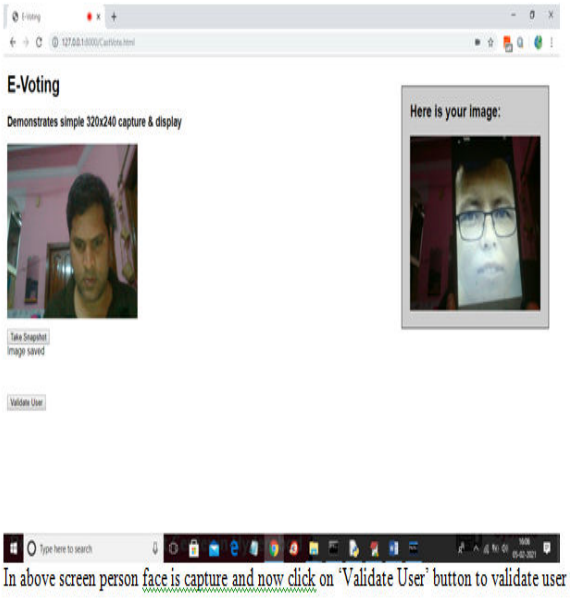
In above screen application first authenticate user by using his login details and once after successful login then user will get below page



In above screen user can click on 'Cast Your Vote' link to get below webcam screen



In above screen webcam is running and then by showing person face we need to click on 'Take Snapshot' button to capture his face



In above screen person face is capture and now click on 'Validate User' button to validate user

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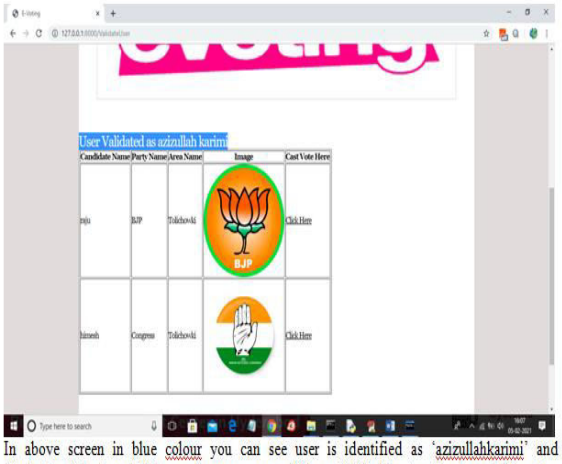
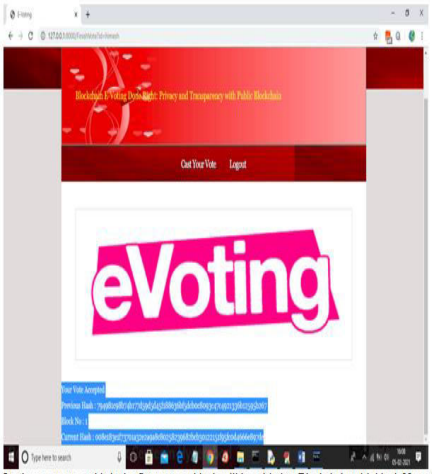
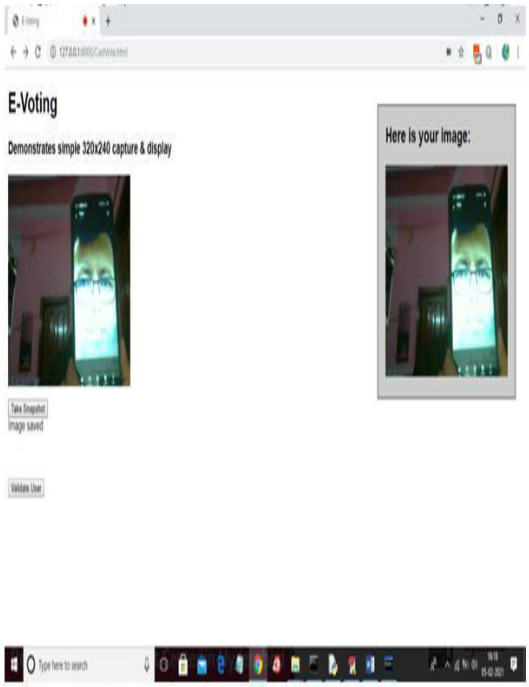


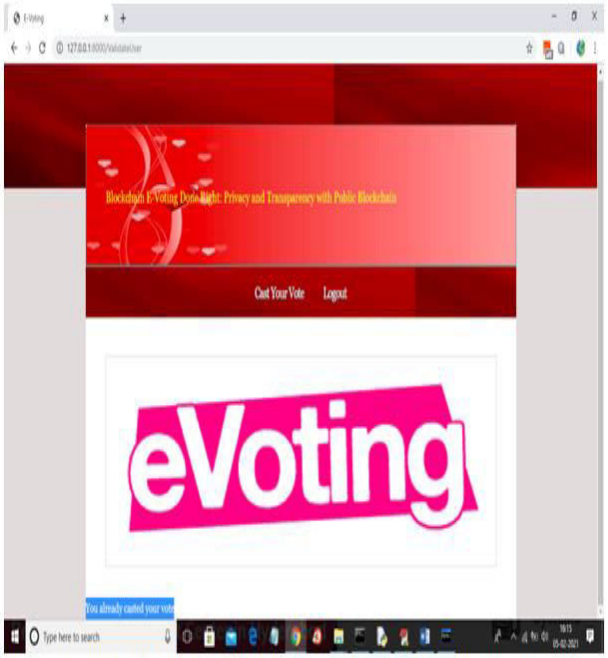
In above screen in blue colour you can see user is identified as 'azizullahkarimi' and then displaying list of candidates and now user can click on 'Click Here' option to cast his vote and to get below screen



In above screen as this is the first vote so block will be added to Blockchain with block No as 1 and we can see Blockchain created a chain of blocks with previous and current hash code validation. Now try again with same user to cast vote



In above screen same user trying again and below is the result



In above screen if same user try again then will get message as 'You already casted you vote' and now logout and login as 'admin' to get vote count

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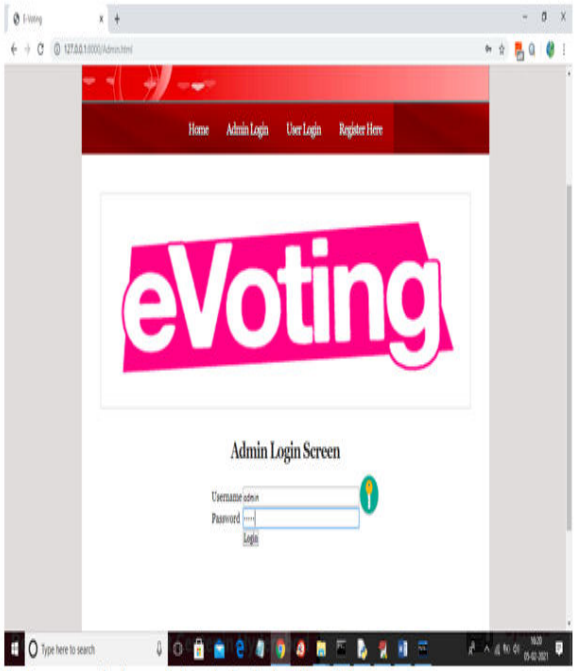
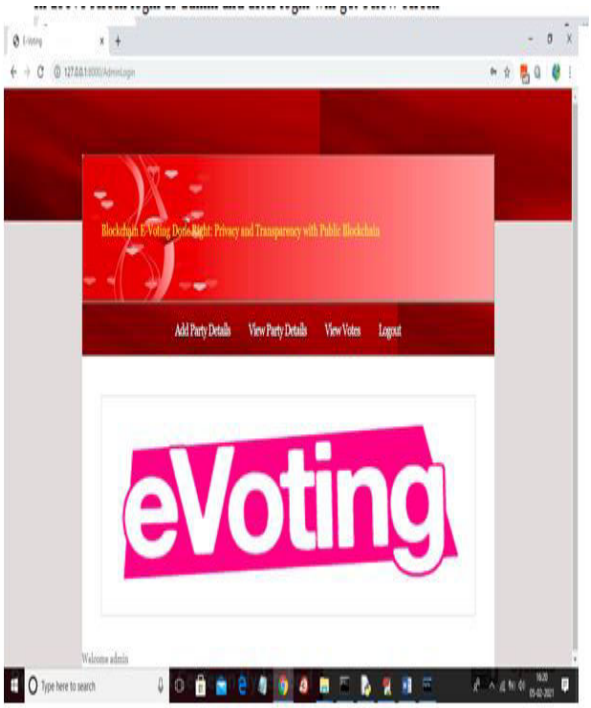
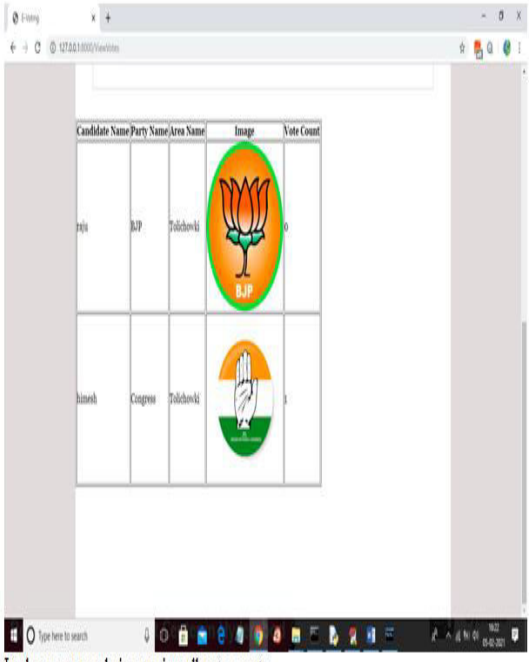


In above screen login as admin and after login will get below screen



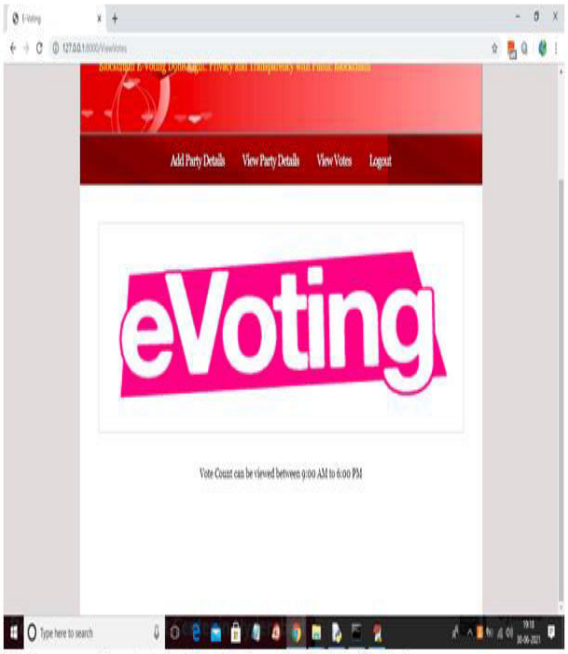
In above screen admin can click on 'View Votes' link to get below screen



In above screen admin can view all vote counts.

As per your request admin can view and count votes between 9 AM to 6 PM and same will applied for voter.

In below screen if ADMIN try to vote count anytime then will get below message



In below screen if user try to login anytime for voting then he will get below message

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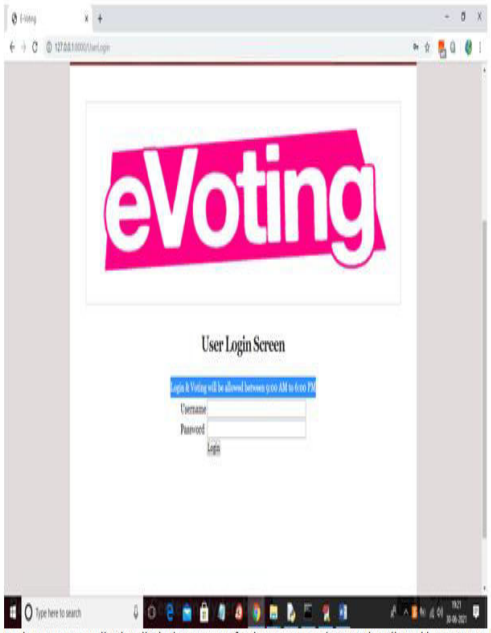
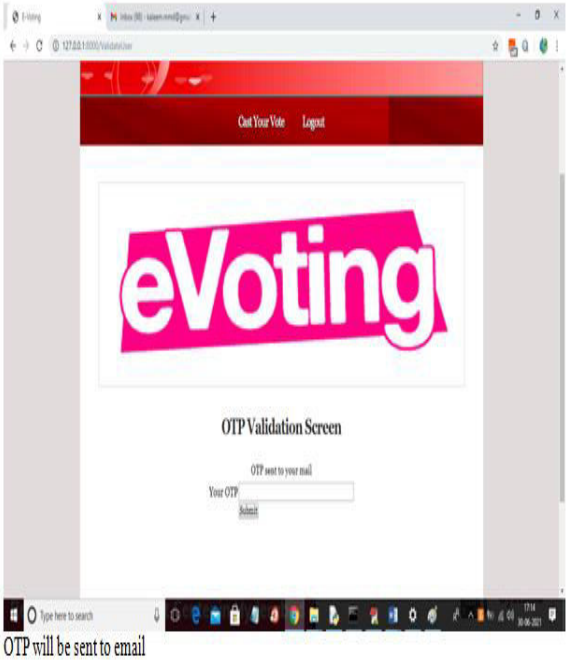
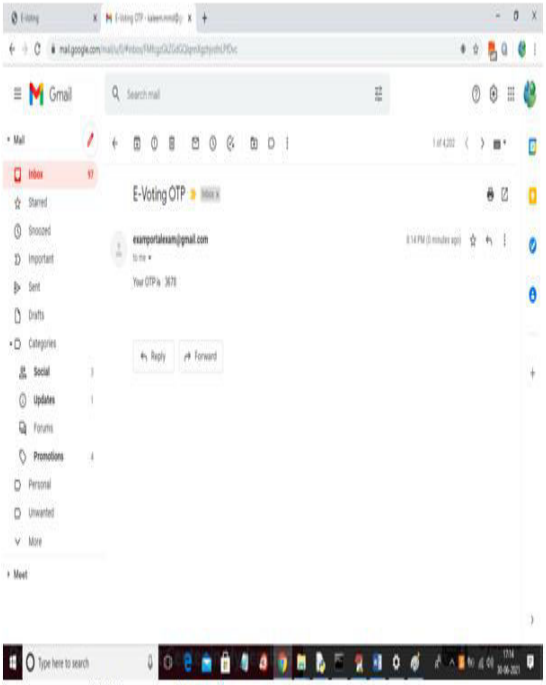


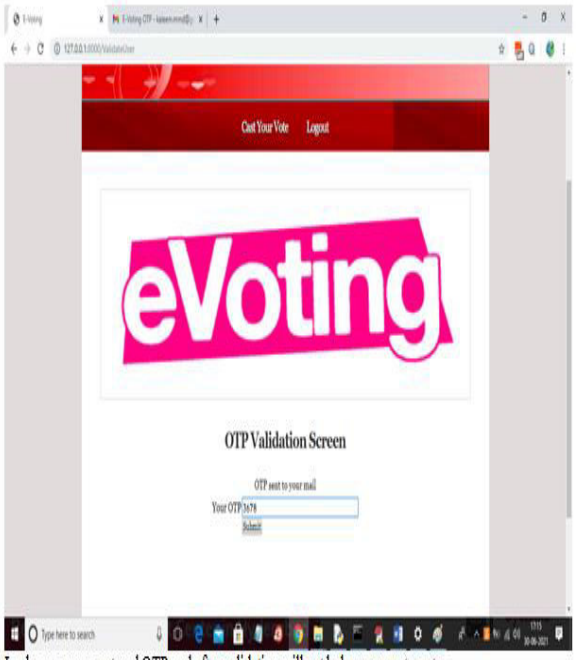
In above screen application displaying message for the user as 'Login & Voting allowed between 9 to 6 PM. Once after validate user then application ask for OTP



OTP will be sent to email



In above screen OTP has arrived to email



In above screen entered OTP and after validation will get below screen to vote

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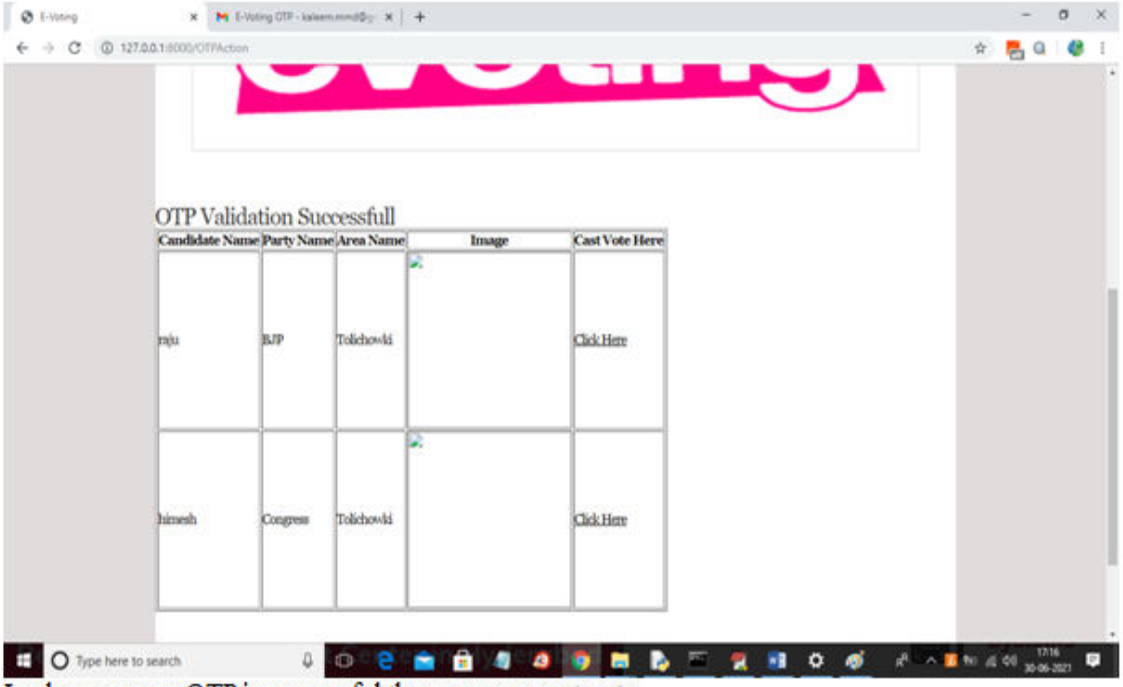

In above screen OTP is successful then user can cast vote

V. FUTURE SCOPE AND CONCLUSION

While we detect somewhat different network times, they are so small that in an election system, because of its data transparency, public blockchain has more advantages, which can be observed in real time. A private blockchain is a bit quicker, but it weakens the system's trustworthiness by being largely centralised, since only the authority operates where it wants to. The table reveals that the typical voice add times for one person are: 6.33 s (median 6.34 s), 6.05 m (median 6.04 s), and 17.75 s, median EthereumRopsten (median 17.93 s). The algorithm used for the consensus and the block time also influence these timings.

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