MGM COLLEGE OF ENGINEERING AND TECHNOLOGY PAMPAKUDA

DESIGN PROJECT REPORT

On

Online Voting System

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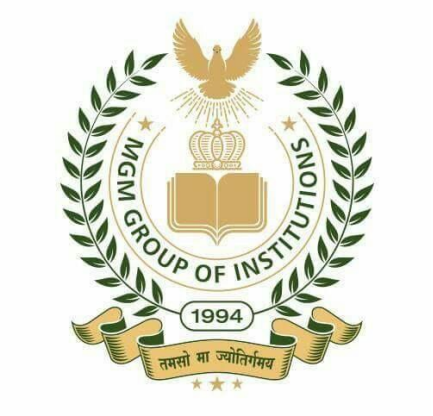

BONAFIDE CERTIFICATE

This is to certify that the design project entitled "**Online Voting System**" is the bonafide work carried out by **Bibin P Varghese** (HKC18CS021), **Nibimol Abraham** (HKC18CS030), **Reshma Sabu** (HKC18CS032) students of B.Tech Computer Science & Engineering, MGM College of Engineering and Technology, during the semester V, in partial fulfillment of the requirements for the award of B.Tech Degree in Computer Science & Engineering.

Asst.Prof. Chinnu C George	Asst.Prof. Deepa P L	Asst.Prof.Suvija S
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ABSTRACT

The project is mainly aimed at providing a secured and user friendly Online Voting System. The problem of voting is still critical in terms of safety and security. This system deals with the design and development of a web based voting system using fingerprint/OTP verification and aadhaar card in order to provide a high performance with high security to the voting system. The proposed Online Voting System allows the voters to scan their fingerprint, which is then matched with an already saved image within a database that is retrieved from aadhaar card database of the government/OTP verification through their registered mobile number in aadhaar database. The voting system is managed in a simpler way as all the users must login by aadhaar card number and click on his/her favourable candidates to cast the vote. By using biometric fingerprint it provides enough security which reduces the dummy votes.

We are developing an online voting system by taking advantage of the centralized database with a web interface. The main concept of this project is to build a website, which allows people to cast their vote online. The election commission will maintain this website. Integrity of the results is guaranteed by preventing the chance of false voting i.e., high secured false proof voting. It is one of the greatest advantages for NRIs, army persons and even old aged citizens as they can cast their vote online by our software.

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LIST OF ABBREVATIONS

SL.NO	ABBREVATIONS	EXPANSIONS
1	OVS	Online Voting System
2	PIN	Personal Identification Number
3	EC	Election Commissioner
4	OTP	One Time Password
5	SMS	Short Message Service

CHAPTER 1

INTRODUCTION

1.1 Introduction to Project

India has a democratic government. As now all Indian citizen become a part of the growing digital India. They have a digital ID that is Aadhar card. Voting schemes have evolved from counting hands in early days to systems that include paper, punch card, electronic voting machine. An electronic voting system which is used nowadays provide some characteristic different from the traditional voting technique, and also it provides improved features of voting system over traditional voting system such as accuracy, convenience, flexibility, privacy, verifiability and mobility. But Electronic voting systems suffers from various drawbacks such as time consuming, consumes large volume of paper work, no direct role for the higher officials, damage of machines due to lack of attention, mass update doesn't allow users to update and edit many item simultaneously etc. These drawbacks can overcome by Online Voting System. This is a voting system by which any voter can use his/her voting rights from anywhere in the country. Voter can cast their votes from anywhere in the country without visiting to voting booths, in highly secured way. That makes voting a fearless of violence and that increases the percentage of voting.

Online voting system is contemplated as an interesting topic in information security research. Online voting system is a way that helps public to select their representatives and express their preferences for how they will be governed. Naturally, the belief of the election process is utmost important. Election process has strong media coverage, particularly if something goes wrong. This system will increase the level of security and also the trust of voters. The problems of Maoist affected places for the voting has been addressed in while describe the genesis of Maoist violence and showed that public needs a more secure way of casting their vote.

1.2 Purpose of the Project

The project is mainly aimed at providing a secured and user friendly Online Voting System. The main concept of this project is to build a website, which should be able to allow people to cast their votes online. This is a simple, safe and secure method that take minimum of time. To make the voting process very easy and efficient wireless and web technologies are used.

1.3 Findings in Existing System

The Existing System of Election is running manually. The Voter has to Visit to Booths to Vote a Candidate so there is wastage of Time. The Voter has to manually register into the Voter List. Also Vote counting has to be done manually. All the Information of the Voter or Candidate is filled manually. Voter must be present in his/her Constituency to give his/her Vote. There are Electronic Voting Machines used nowadays which provide some characteristics different from traditional voting system, and also it provides improved features of voting system over traditional voting system such as convenience, accuracy, flexibility, privacy, mobility. But this system suffers from various drawbacks such as time consuming, consumes large volume of paper work, no direct role for the higher officials, damage of machine due to lack of attention, mass update doesn't allow user to update and edit. The voting system previously being used by the Government is a paper based system, in which the voter simply picks up ballots sheets from electoral officials, tick off who they would like to vote for, and then cast their votes by merely handing over the ballot sheet back to electoral official. It does not provide people the way in which they can get the details about the nominee as well. Also, they can't get to know the history of the people for whom they are standing in the queue for giving their vote.

1.4 Proposed System

This Online Voting System will manage the Voter's information by which voter can login and use his voting rights. There is a Database which is maintained by the ELECTION COMMISION OF INDIA in which complete data of voter with complete information is stored. At the time of registration voter will be asked for this: Full name, age, aadhar card no, mobile no. email id, finger prints and verified the details by administrator. At the time of requesting vote, voter will be asked to enter his aadhar id. Then voter will be

authenticated, and he can give vote from one of the candidate from the list. If voter already has Aadhar Id then he/she don't need to register, else before voting he/she need register himself/herself in aadhar database.

1.5 System Operation

The Election Commissioner has the admin privilege having the authority to store the user information, providing registration and performing the adding, deleting and updating the voters' and candidates' information. The admin grants permission for the voters to vote within a particular date specified, once the election is declared. In this system, the voters have the provision to view the candidate details by which they will get an outline about whom they are electing. The voter can login using their own username and password and after entering the verification code, they can vote for their desired candidate. Once a person cast his/her vote with proper authentication, revoting will be prohibited. Once the voting is done all the counting will be made online and results is displayed. Integrity of the results is guaranteed thereby preventing the chance of false voting.

CHAPTER 2
EXISTING SYSTEM

2.1 Limitation of Existing System

The problems of the existing manual system of voting include among others the following:

i. Expensive and Time Consuming: The process of collecting data and entering this data into the database takes too much time and is expensive to conduct, for example, time and money is spent in printing data capture forms, in preparing registration stations together with human resources, and there after advertising the days set for registration process including sensitizing voters on the need for registration, as well as time spent on entering this data to the database.

ii. Too Much Paper Work: The process involves too much paper work and paper storage which is difficult as papers become bulky with the population size.

iii. Errors During Data Entry: Errors are part of all human beings; it is very unlikely for humans to be 100 percent efficient in data entry and when this happens especially during thumb printing this makes the vote invalid.

iv. Loss of Registration Forms: Some times, registration forms get lost after being filled in with voters‟ details, in most cases these are difficult to follow-up and therefore many remain unregistered even though they are voting age nationals and interested in exercising their right to vote.

V. Short Time Provided to View the Voter Register: This is a very big problem since not all people have free time during the given short period of time to check and update the voter register.

CHAPTER 3
PROPOSED SYSTEM

Online Voting System is a voting system by which any voter can use his/ her voting rights from anywhere in the country. Online Voting opens up new possibilities and brings a unique experience to the voting process. It is about improving voter convenience and accessibility, improving accuracy and the security of the voting process and the rapid feedback of election or ballot results.

3.1 Basic Features

1. SECURITY AND INTEGRITY: Are imposed by using 'state of the art'. Online Voting Software with initiatives to ensure the security and integrity of Election and Ballot processes. The voting website is well designed and implemented into a secure server which also stores the database of eligible voters. Security of process is implemented by requiring voters to provide authentication details before gaining access to the Online Voting Ballot screens.

Online Voting affords increased levels of general Election or Ballot security compared with traditional polling Booth or Postal Voting processes. Depending upon the information available through an organizations voter database, and also depending upon the level of security required, varying levels of voter authentication, the grater the level of security.

Every voter's vote is secret. When the voter confirms their vote selection(s), the online voting system "consumes" the Password/ Personal Identification Number (PIN) and "marks" the Voter Roll (database), to indicate that the user has voted. System capability provides for the simultaneous storing of the actual vote details in a separate database, this ensures that the voter can vote once and that their vote is anonymous, as the vote can no longer be associated with their details on the Voter Roll.

2. ACCESSIBILITY: For voters is greatly enhanced through Online Voting because eligible voters can vote using any internet/ online enabled computer and mobile phones,

anywhere in the world. This could be from their home, their workplace, an internet cafe, from a library or even on a cruise ship and no special software or browsers are required.

Online voting also increases opportunities for participation from those voters who might be situated remotely from traditionally polling facilities, those who might be visiting overseas, those who have physical disabilities or who might be ill or infirm, and those who religious beliefs might preclude attendance at polling booths during the normal hours/ day of polling.

3. SIMPLICITY: Is a keynote of online voting. All a voter is need to do is Login to the secured voting website located on the server, key in their authentication details (usually a Member or Employee Number and a Password/ PIN) and access is granted to the ballot screen (or screens). If candidate or like promotional statements are a feature of your Elections or Ballots, then a voter could access the candidate promotional statements (including photographs, if permissible under the relevant governance requirements) on – line, simply by "clicking" on the relevant candidate's name.

Once a voter makes their selections, by "clicking" inside a box beside their chosen candidate or in the case of a Collective Agreement Employee Ballot, by "clicking" in either the "YES" or "NO" box, a screen will appear confirming the voter's selection(s). At this stage a voter either is able to confirm and submit their selections by simply looking at the "Confirmation Screen", or they may amend their ballot by "clicking" on the "Return" button. Once their vote is cast and submitted, a "Thank You" screen appears completing the voting process.

Thus, the Online Voting System provides the distinct advantage of the voter being able to visualize every step in the voting process, as well as having the flexibility and capacity to amend their vote, prior to final submission. And the voter can even print out a confirmation that their vote has been cast.

4. RAPID: tabulation of results is characteristics of online voting. In fact, the Election or Ballot Results theoretically are instantaneously available; there is no waiting for the conduct of potentially in accurate manual counts, or for the data keying or electronic scanning of Ballots. As soon as our standard internal checking processes are completed, the results are available to clients. And if there are complex voting systems involved, whether

variants of preferential or "first past the post" system, will apply those systems to deliver absolutely accurate count outcomes and output reports, again virtually instantaneously.

5. COST SAVINGS: accrue through application of online voting compared with traditional attendance (Polling Booth) and /or Postal Voting. With attendance voting, there are obvious significant infrastructure costs involved, for example the provision of staff, the hire of polling premises and equipment, costs of undertaking the counting of votes etc.

On the other hand, with Online Voting, once the relevant web screens have been developed, essentially there are few other costs. Online Voting is more efficient than other traditional processes and would be confident that Election or Ballot costs will be substantially reduced.

3.2 System Requirements

1. Software Requirements
    - Operating System: Windows
    - Back-end: Microsoft SQL server 2012
    - Browser: Mozilla Firefox
2. Hardware Requirements
    - Intel Pentium / processors with speed minimum T4300, (2.10Ghz)
    - Minimum 1GB RAM.
    - Accelerated graphics card.
    - Minimum 50MB hard disk.

3.3 Resulting Benefits

As we are looking at the existing system, they are just providing online voting. As we knew that Government of India contain multiple elections. So we are implementing our system such that voter can select election and submit their vote region/ward wise. After studying existing system, we observed that they are not providing state wise, region wise voting facility. So it's difficult to vote because there is no restriction, so voter can also cast

his/her vote to those candidates who is not belonging from his/her area. In proposed system we are implementing that voter can cast his/her vote only those candidate who's belonging from his/her region/ward. We will display only those candidates who are belonging from that particular voters' ward. So it will also help to conduct small election such as Gram Panchayat Election or Nagar Sevak Election. We are making our voting system user friendly.

3.4 Future Scope

i. Increasing number of voters as individuals will find it easier and more convenient to vote.

ii. Less effort and less labour intensive, as the primary cost and focus primary on creating, managing, and running a secure web voting portal.

iii. The system can be used anytime and from anywhere by the Voters.

iv. No one can cast votes on behalf of others and multiple times.

v. Saves time and reduces human intervention.

vi. The system is flexible and secured to be used. vii. Unique Identification of voter through Aadhar number.

viii. Improves voting with friendly Interface.

ix. No fraud vote can be submitted.

3.5 Advantages

- Time saving.
- Working load reduced.
- Information available at time.
- It provides security for the data.
- Saves time and reduces human intervention.
- Easy to use and debug.

CHAPTER 4

UML DIAGRAMS

A UML diagram is a diagram based on the UML (Unified Modelling Language) with the purpose of visually representing a system along with its main actors, roles, actions, classes, in order to better understand, alter, maintain, or document information about the system.

A UML class diagram is not only used to describe the object and information structures in an application, but also show the communication with its users. It provides a wide range of usages; from modelling the static view of an application to describing responsibilities for a system.

"Importance of UML Diagrams in Software Development": The Unified Modelling Language (UML) is a standard language for specifying, visualizing, constructing, and documenting the classes of software systems, as well as for business modelling and other non-software systems.

UML helps to organize, plan and visualize a program. In addition, being a standard, it is widely used and accepted as the language for outlining programs. UML is used in a variety of purposes and its readability and re-usability make it an ideal choice for programmers.

The UML diagrams are organized into two distinct groups: structural diagrams and behavioural or interaction diagrams.

Structural UML diagrams

- Class diagram
- Package diagram
- Object diagram
- Component diagram
- Composite structure diagram
- Deployment diagram

Behavioural UML diagrams

- Activity diagram
- Sequence diagram
- Use case diagram
- State diagram
- Communication diagram
- Interaction overview diagram
- Timing diagram

Use Case Diagram

Use case diagrams give a graphic overview of the actors involved in a system, different functions needed by those actors and how these different functions interact.

Sequence Diagram

Sequence diagrams in UML show how objects interact with each other and the order those interactions occur.

Activity Diagram

Activity diagrams represent workflows in a graphical way. They can be used to describe the business workflow or the operational workflow of any component in a system.

Class Diagram

Class diagrams are the main building block of any object-oriented solution. It shows the classes in a system, attributes, and operations of each class and the relationship between each class.

In most modelling tools, a class has three parts. Name at the top, attributes in the and operations or methods at the bottom. In a large system with many related classes, classes are grouped together to create class diagrams. Different relationships between classes are shown by different types of arrows.

Object Diagram

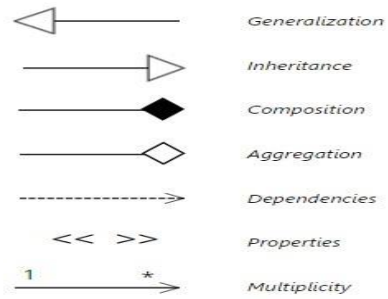
Object diagram is a UML structural diagram that provide a snapshot of the instances in a system and the relationship between the instances.

UML Diagram Symbols

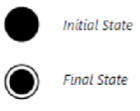
There are many different types of UML diagrams and each has a slightly different symbol set. Class diagrams are perhaps one of the most common UML diagrams used and class diagram symbols centre around defining attributes of a class. Visibility of any class members are marked by notations,

+ Public
# Protected
- Private
/ Derived
~ Package

Lines are also important symbols to denote relationships between components. Generalization and Inheritance are denoted with empty arrowheads. Composition is shown with a filled in diamond. Aggregation is shown with an empty diamond. Dependencies are marked with a dashed line with an arrow.



Activity diagrams have symbols for activities, states, including separate symbols for an initial state and a final state. The control flow is usually shown with an arrow and the object flow is shown with a dashed arrow.



Use case diagrams have symbols for actors and use cases.

Use Case Diagram

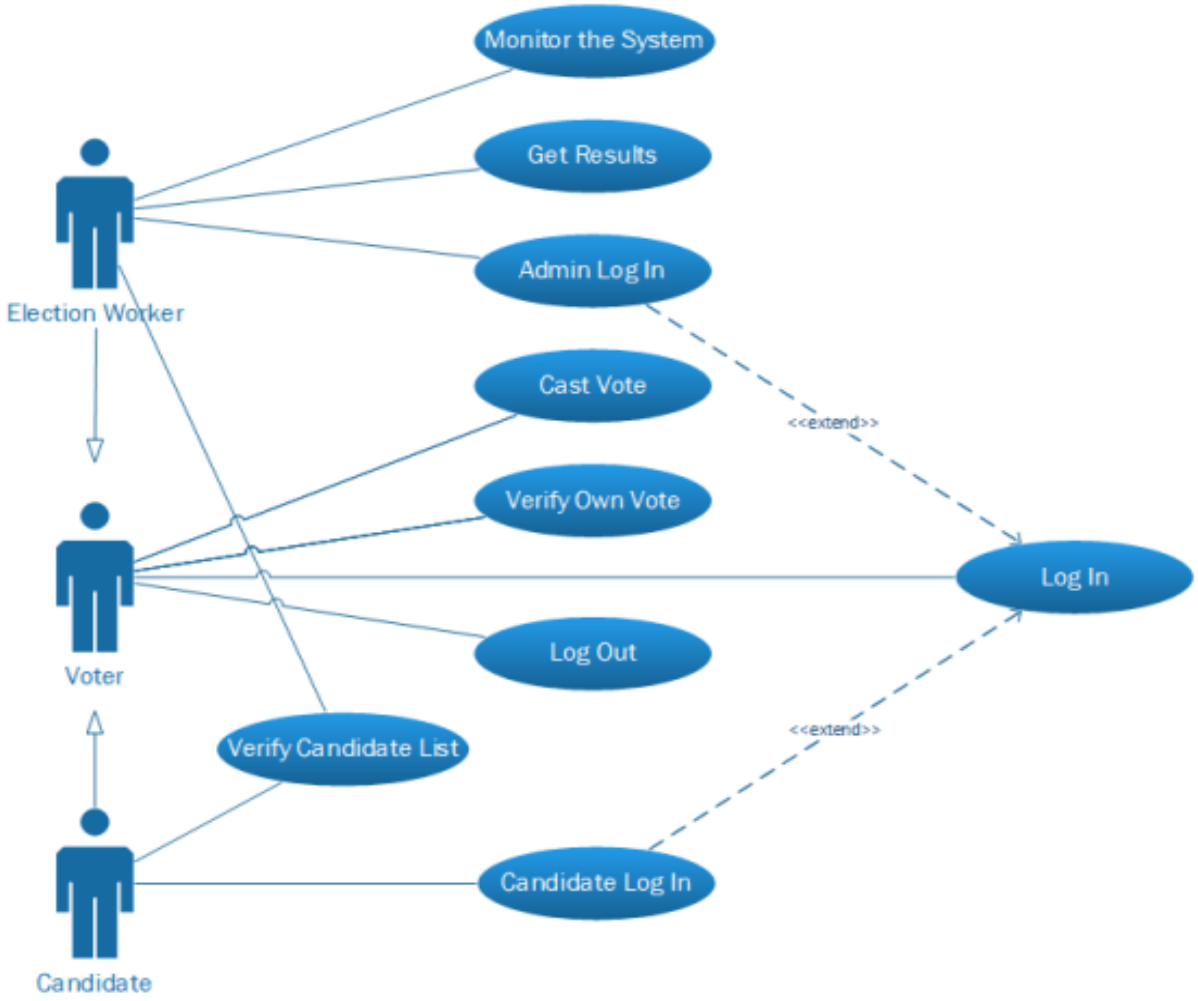


Fig.4.1 USE CASE DIAGRAM

The use case diagram for the Online Voting System involves 3 use cases namely **Election worker** same as **admin, Candidate, Voter**. Use cases are log in, monitor the system, get details, cast vote, logout. Here the candidate and admin are generalized into voter. The election worker can monitor the system as admin, they conduct election and publish results. As admin as a voter he /she can cast their vote. The voter can cast vote and verify own vote. First he/she must login to the system using their name and aadhar details. The candidate can give the nomination and verify the candidate list. Also they can update their profile. Since candidate is generalized in voter he /she can vote. As a whole, the actor Election worker maintains the data security and integrity.

Sequence Diagram

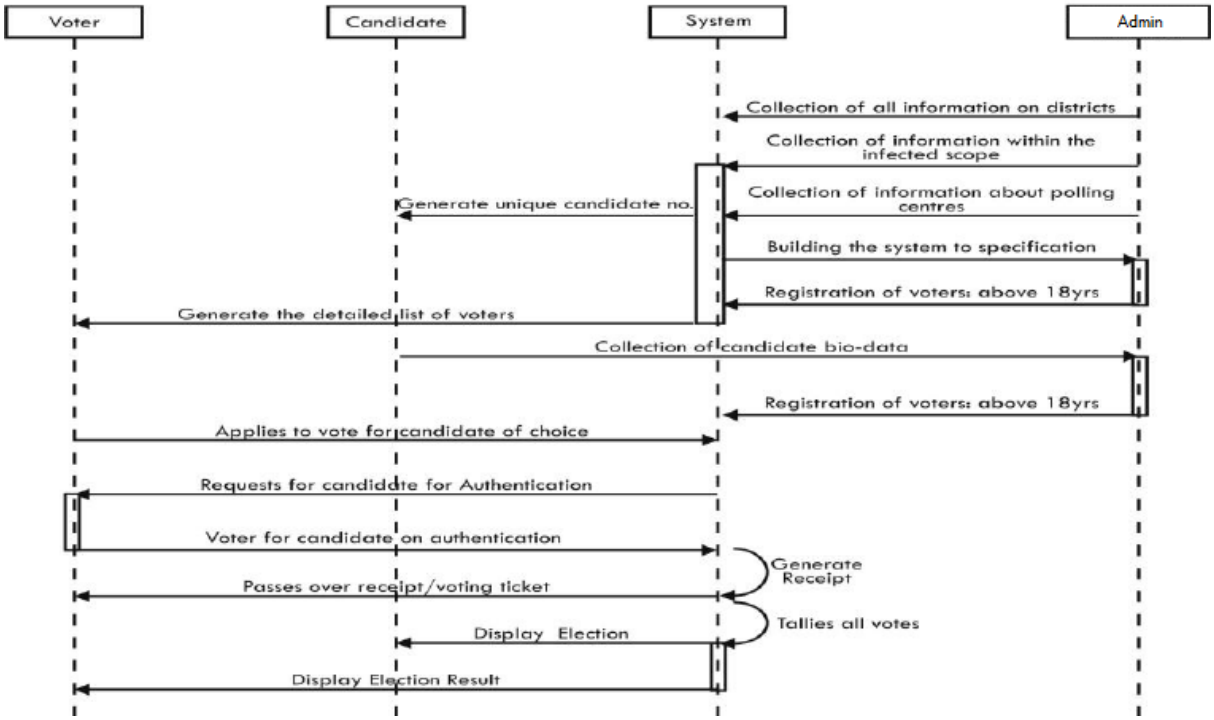


Fig.4.2 SEQUENCE DIAGRAM

The sequence diagrams show the interaction between the objects in the system. There are 4 objects namely **Admin**, **System**, **Candidate** and **Voter.**

The admin i.e., the Election Commissioner performs duties like collection of all information on districts, within the infected scope and about polling centres and also registers the voters above 18 years which activates the object: System which generate unique candidate number. This activation in turn activates the object: Admin that helps the system to generate the detailed list of voters. The object Candidate provides their details to admin which activates the object for registration of voters above 18 years. The object: Voter cast their vote for desired candidate to the system which in turn verifies the voter and candidate. Then, the object: System tallies all the votes and activates the object thereby displaying the result to the candidate and the voter.

Activity Diagram

Admin:

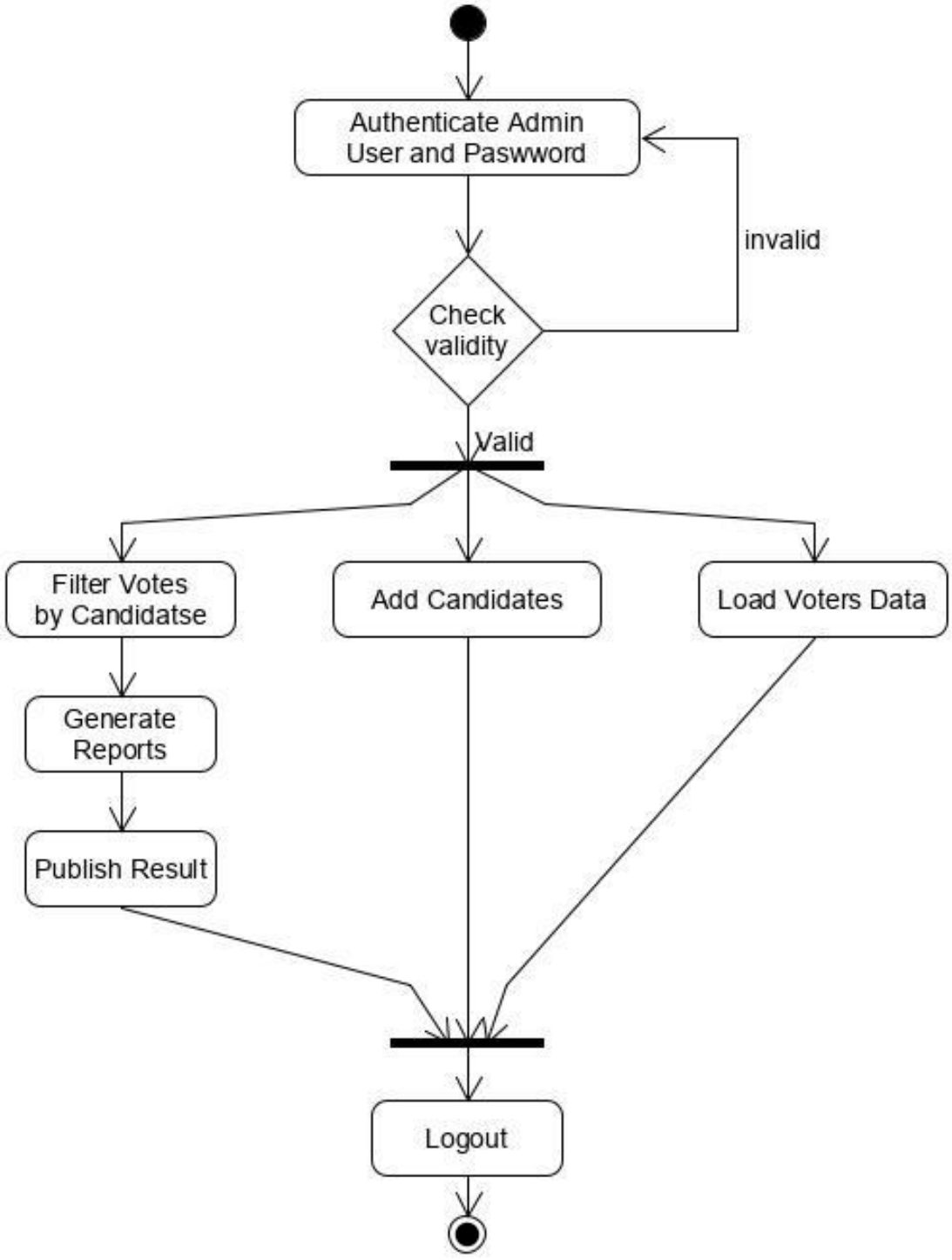


Fig.4.3.1 ACTIVITY DIAGRAM - Admin

Candidate:

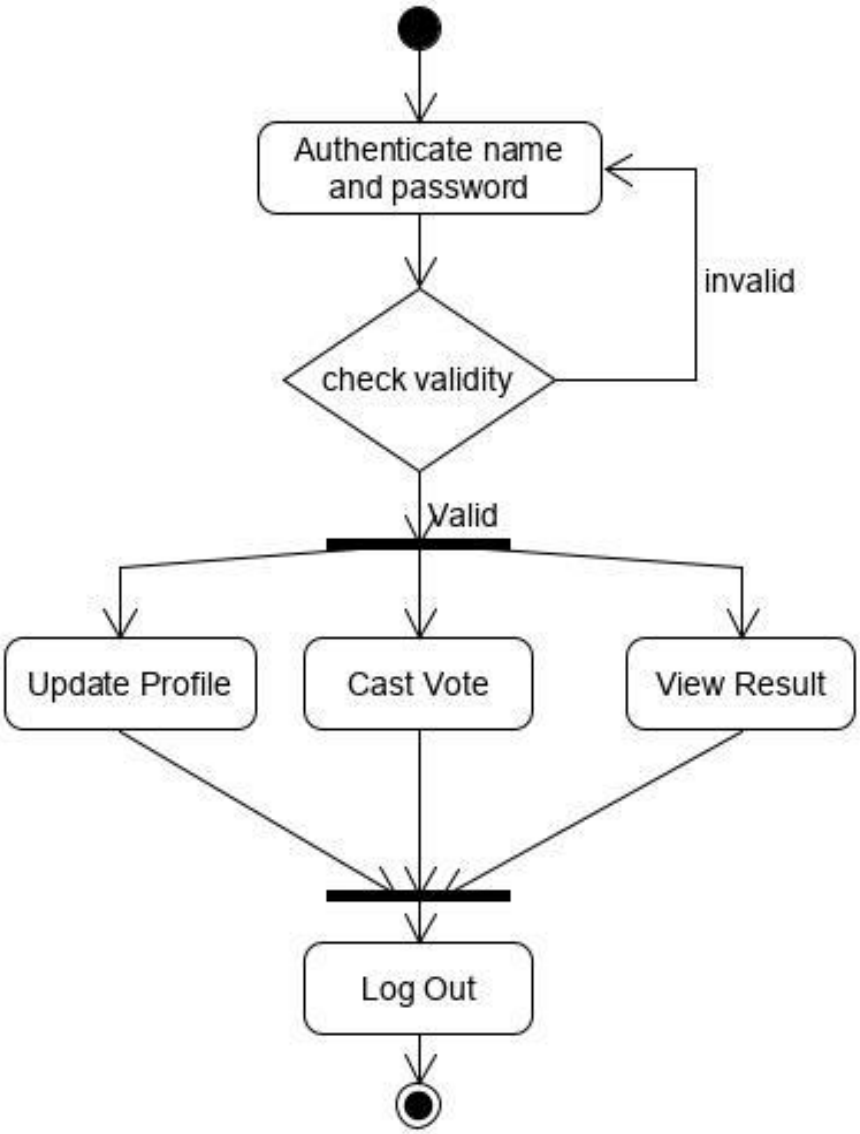


Fig.4.3.2 ACTIVITY DIAGRAM - Candidate

Voter:

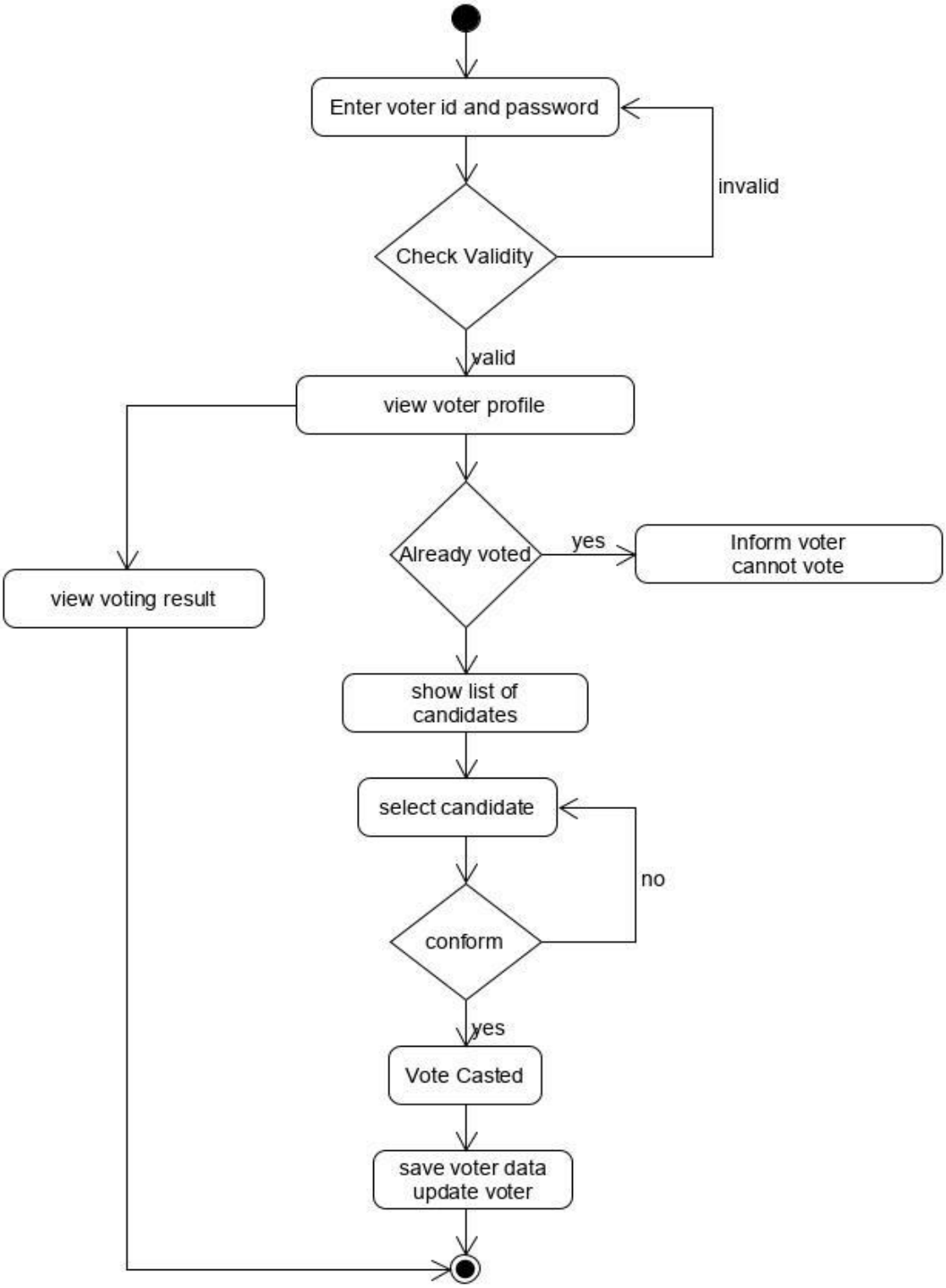


Fig.4.3.3 ACTIVITY DIAGRAM - Voter

In our proposed system, the **Admin** session begins when the admin enters a valid username and password. If the username or password are invalid an error screen is displayed and no session is started. The admin is allowed to perform one or more tasks, choosing the task each time from a menu of options. The admin can add candidates for election, load voters' data and conduct election. After voting time admin can filter votes by candidates and generate reports about the number of votes for each candidates and publish result. The admin session ends when he/she log outs.

The **Candidate** session begin when a candidate enters a valid username and password. Like admin, if username or password is invalid, an error screen is displayed. The candidate can choose options whether to update profile, cast vote or view result. When candidate logout, the session will end. The voting process of candidate is same as that of voter session. The **Voter** session also starts with username and password. If the login is valid voter can view their profile and check whether he/she has voted. If he/she is voted a message will be displayed as " He cannot vote/already have voted ". If not valid, voter can view the list of candidates. They can select one candidate and confirm their vote. After casting of vote, the system will save voter data to the server and update the voter. The voter can also view voting result from their profile. The voter can also logout from their profile.

Class Diagram

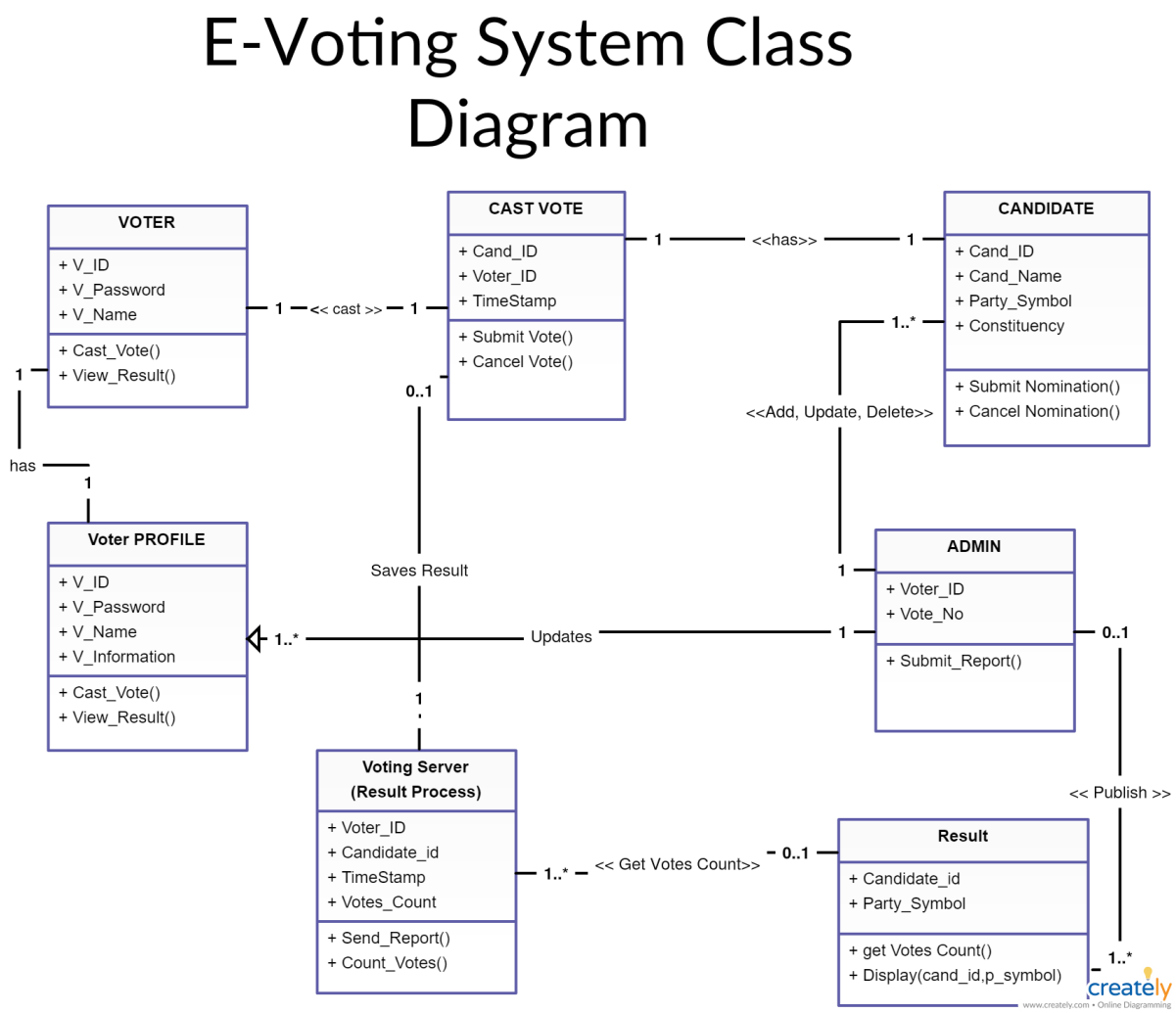


Fig.4.4 CLASS DIAGRAM

The class diagram contains classes along with their attributes and behaviours. The relation between different classes makeup a class diagram.

VOTER is the class name and V_ID, V_PASSWORD, V_NAME are the attributes and Cast_vote () and View_result () are the operations. CAST VOTE is the class name and its attributes are Cand_ID, Voter_ID, TimeStamp and its methods are Submit_vote () and Cancel_vote (). Voter has voter profile, class VOTER PROFILE. It contains the attributes V_ID, V_PASSWORD, V_NAME, V_INFORMATION and behaviours are Cast_vote (), View_Result (). ADMIN can Add, Update, Delete candidate and can Update Voter profile. Candidate can cast their votes. After casting their votes, save results in voting server. ADMIN publish the result.

Object Diagram

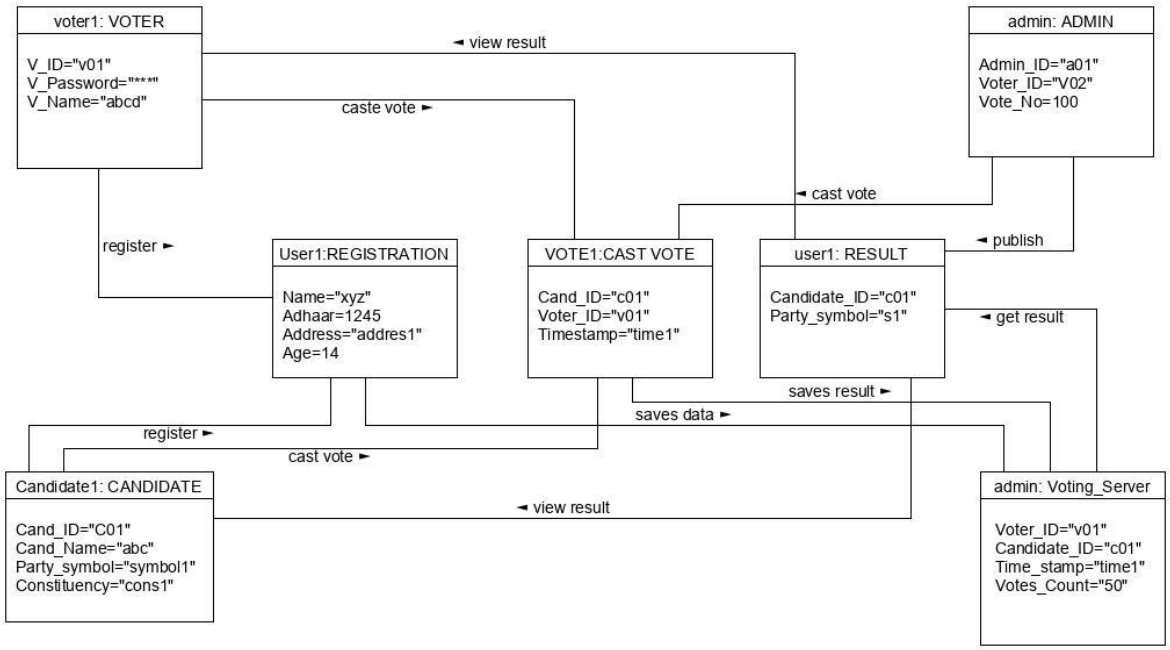


Fig.4.5 OBJECT DIAGRAM

The object diagram is based on the class diagram. It depicts objects of the classes we created earlier. Here the objects are VOTER1, USER1, CANDIDATE1, VOTE1, USER1, ADMIN.

VOTER1 is an object of VOTER class. USER1 is an object of REGISTRATION class. Voter1 is an object of VOTER class and it contains the attributes V_ID, V_PASSWORD and V_NAME along with values. Candidate1 is an object of CANDIDATE class and it contains attributes assigned with values. User1 is an object of REGISTRATION class along with its attributes. Vote1 is an object of class CAST_VOTE and it contains attributes Cand_ID, Voter_ID and Timestamp with their values. Similarly, User1 object of class RESULT, Admin object of class ADMIN and Admin object of class VOTING_SERVER contains the attributes along with their values.

CHAPTER 5

CONCLUSION

Online Voting Systems have many advantages over the traditional voting system. Some of these advantages are less cost, faster generation results, easy accessibility, accuracy, and low risk of human and mechanical errors. It is very difficult to develop online voting system which can allow security and privacy on the high level. Future development focused to design a system which can be easy to use and will provide security and privacy of votes on acceptable level by proper authentication and processing section. It is easy to use and it is less time consuming. It is very easy to debug.

Generally voting has to be perform by user by going to the voting center which is not possible by many users like army person, NRI and even old aged citizens. Therefore, we have to implement an online voting system by which the users can vote online- anytime and from anywhere in highly secured way which will bring a solution to the problems faced by present day existing systems. This will make voting a fearless of violence and that too it increases the percentage of voting as individuals will find it easier and more convenient to vote. This system is quite robust as it takes care of authentication as well as security of voter's data stored in the server. Moreover, this system is less effort and less labour intensive as the primary cost and focus is on creating, managing and running a secure web voting portal.

REFERENCES

[1] Himanshu Agarwal and G.N. Pandey "Online Voting System for India Based on AADHAAR ID" 2013 Eleventh International Conference on ICT and Knowledge Engineering

[2] Smita B. Khaimar, P. Sanyasi Naidu, Reena Kharat "Secure Authentication for Online Voting System"

[3] Shivendra Katiyar, Kullai Reddy Meka, Ferdous A. Barbhuiya, Sukumar Nandi "Online Voting System Powered By Biometric Security" 2011 Second International Conference on Emerging Applications of Information Technology.