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Electronic voting system via biometric (EVS)

Bachelor of Science in Computer Science

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Certificate

We accept the work contained in the report titled ”Electronic voting system via biometric (EVS)”, written by Mr. Ahmad Faraz AND Mr. Muhammad Qasim Javed as a confirmation to the required standard for the partial fulfillment of the degree of Bachelor of Science in Computer Science.

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Abstract

The problem of voting is still critical in terms of safety and security. This paper deals with the design and development of a desktop-based voting system using fingerprint in order to provide a high performance with high security to the voting system also we use web technology to make the voting system more practical. The new design is proposed an election for a country for selecting the president of the country. The proposed EVS allows the voters to scan their fingerprint, which is then matched with an already saved image within a database. The software is implemented completely as a .net managed code in C-Sharp. Upon completion of voter identification, voters are allowed to cast their vote using voting website. Casted vote will be updated immediately. The result shows that the proposed electronic voting system is fast, efficient and fraud-free.

Contents

List of Figures

List of Tables

Chapter 1

Introduction

Biometric voting system is a desktop based application. The main purpose of our system biometric voting system by using finger prints identification method. Voters' thumb impressions are used for identification during voting. When the voter places his/her thumb on scanner, the system will check whether it matches with the pre-stored impression in the database or not. If it matches then our system will allow the voter to poll his/her vote thereby reducing the chances of election rigging.

1.1 Project Background/Overview

Our proposed solution is basically a desktop based application which will contain a database of all the voters of a particular region. Biometric voting system will include:

- Provision of improved voting services to voters through fast, timely and convenient voting.
- Reduction of cost incurred by Departments commission during voting time due to additional support staff to conduct elections via manual system.
- Rejected/Deceased/Invalid voters will not able to poll their vote.

Therefore, vital points that this Biometric voting system emphasize are listed as below:

- Requires less number of staff during the election.
- This system is a lot easier to independently moderate the election and subsequently reinforce its transparency and fairness.
- Less capital, less effort and less labor intensive as the primary cost and effort will focus primary on creating managing and running a secure and transparent election.

- Increase turn out of potential voters as individuals will find it easier, safer and more convenient to vote using this reliable system.

1.2 Problem Description

In manual polling process, the issue of missing data in the manual voter registration files is a norm. There are also other scenarios where unregistered voters enter the polling center as "Dead Voters" to participate in the voting process. Even after voting, top authorities like clerks and officers of polling station may interfere and rig the election results. This mostly results in cases of post-election violence as opposition gets the idea that polling stations have been rigged.

1.3 Objectives

The basic idea of voting system is a biometric voting technique. In this system people who are students and faculty members of Bahria university Islamabad can give his/her vote going to physically in the polling station. Polling station consists of voter detail and system status. The information given by the voters will be checked using existed database. This desktop application provides fair and accurate voting system by scanning active user finger prints. It will involve counting of electronic ballot papers and real-time results will available quickly. Voters shall be able to vote only once.

1.4 Project Scope

We will display the working of our proposed system with 10 to 20 person's bio data saved in our database. Only one fingerprint against each person will be saved. The project has a wide scope and areas of usage. This can be used as verification of personals and then for polling on any event.

1.4.1 Software Module

In this module following functionalities will be involved:

- Requirements
- Registration
- Sign in – out
- Manage candidate
- Manage voters

- Add new election
- Manage polling station
- Vote cast
- Recognize
- Generate report

1.4.2 Hardware Module

In this module following functionalities will be involved:

- Finger print reader
- Desktop PC / Notebook

1.4.3 Desktop Module

In this module following functionalities will be involved, we will make up one distributed database.

- Database for voters
- Database for Candidates.
- Database for Employees.
- Database for Admins.

Chapter 2

Literature Review

2.1 Past Work

Vote casting was done manually in the earlier days, thus relying on the sincerity and honesty of the polling station staff members who were in charge of vote counting at the end of every election. This system was very labour intensive and allowed many types of potential corruption in the process of vote counting. This caused several ambiguities in the democratic nations all over the world. The third world countries are still facing this menace of manual voting where rigging is easily possible because of a large number of polling stations and generally less able man power to control the process fairly. The countries where elections are taken seriously by the government officials are thinking on this unique and better idea for getting the feedback of the republic after a term of governance. The efforts to resolve this complicated yet seminal problem is addressed all around the globe, where the western countries have taken a leap forward than the global south. In traditional elections, a voter as a rule goes to the surveying stations. After direct individual confirmation with a few IDs, the voter is permitted to vote. The voter is then given a poll which permits a solitary vote. Once the tally is utilized, it can't be utilized once more. Notwithstanding, this poll should likewise be mysterious. The poll must distinguish the voter as being allowed to vote, however not uncover their genuine character, and the voter should likewise be given affirmations of this. Customary surveying strategies believe a considerable measure of gatherings amid the race. The present strategies require an aggressor connect straightforwardly with the voting procedure to disturb it. There is a more prominent shot of defilement and error of votes which causes colossal impact on nation level. To conquer this issue, we have proposed an online biometric empowered vote throwing framework.

2.2 Case Studies

2.2.1 Electronic Voting System in Brazil

Brazil is an example of a country with a thriving electronic voting system [1].. In 2000, it became the first country to have elections completely by an electronic voting system and has since remained at the forefront of the electronic voting movement. Electronic Voting Machines for Brazilian elections were developed and first tested in the 1996 elections in Santa Catarina. Thereafter it was used in national elections in 1998, when it then became the only voting method for the 2000, 2002, 2004, and the most recent 2006 elections. Through these election cycles, the voting system has changed most notably in the operation system running on the machines. This effort to constantly build upon and improve the voting system is likely part of the reason for its strong success. In Brazil, the research and development of electronic voting systems is funded by the Brazilian Supreme Electoral Court (TSE), which is also currently testing ways to improve the system, such as by using a digital screens and printing systems. These improvements likely have been a significant source of voter satisfaction, and will continue to emphasize the government's commitment to a fair and effective system in the future.

Interestingly, the code for the software on the Electronic Voting Machines has not been released to the public, despite the call for freely available source code in many electronic voting circles. Just as in the majority of systems in place in the United States and France, companies are protecting this information, refusing to release it to the public under the protection of intellectual property rights.

Although no election is ever without some controversy, Brazil has also maintained a relatively trouble-free experience with its electronic voting approach and serves as a good model for other similar countries looking to fully integrate these systems

2.2.2 Presidential Elections, 2007 FRANCE

Since its inception, electronic voting has been met with some skepticism and opposition, but never more so than in France [2]. This year's general elections in France demonstrated how strong that opposition can be, even in the face of record turnouts. Electronic Voting Machines in France were first authorized in 2004, although the 2007 presidential elections were the first opportunity for electronic voting to be used in general elections. First-round elections saw a record high of 85 percent voter turnout - 37.6 million voters in total. And of the total number of eligible voters, 1.5 million were predicted to turn to e-voting instead of the traditional method of ballot envelope and clear box. This is quite a large percentage, considering these machines were only implemented in 82 of 36,000 of voting districts. But the 2007 elections were not the first hint of change. In 2003 for the election of the representatives to the Assembly of the French Citizens Abroad, French citizens were

allowed to use remote internet voting. Over 60 percent of the electorate chose to vote via the internet rather than using paper votes.

This first instance of electronic voting (although not in polling centers or for large general elections) began a wave of debate over the use of this kind of voting in the future. The "Forum des droits sur l'Internet" in 2003 published a recommendation report, what is the future of electronic voting in France? , which clarified the reasons for and against e-voting but ultimately concluded that this system of voting could be introduced into the French electoral process following a gradual and reasoned approach. The same report argued that electronic voting simplifies the voting process, offers an increased opportunity for political participation, and is generally in line with increasing use of information and computer technologies (ICT) throughout France.

However, the debate leading up to the 2007 presidential elections was mostly one sided against the use of voting machines. In fact, all of the main political parties except for "Union pour un Mouvement Populaire(UMP)" were opposed to electronic voting in general elections. Among the major points, were security, ease of use, and cost of the machines. France is a strong example of a country just beginning explore the full options of electronic voting. It currently also enjoys the benefit of having many available examples of how other countries have successfully implemented electronic voting systems.

2.2.3 Case Study of Nigerian Electoral System

This project is a design of an electronic voting application that can be used to conduct an election at any level of democratic governance [3].. Every eligible voter is assigned a unique voters code with each he will log-in to the system and cast his vote. A candidate can login to the system as many times as possible but' is entitled to only one vote. The application is designed as a stand-all application with JAVA and C-Sharp and will therefore be installed on computers located in polling stations all around the country. Results can be accessed real-time as the election progresses.

2.3 What We Are Doing

Fingerprint Based Voting Project is an application where the client is perceived by his finger design. Since the finger example of every individual is distinctive, the voter can be effortlessly validated. The framework permit the voter to vote through his unique mark. Unique finger impression is utilized to remarkably recognize the client. The unique finger impression details elements are distinctive for every person. Unique mark is utilized as a validation of the voters. Voter can vote the applicant just once; the framework won't permit the contender to vote in favor of the second time. The framework will permit administrator to include the applicant name and competitor photograph who are assigned for the decision.

Administrator just has the privilege to include applicant name and photograph who are assigned. Administrator will enlist the voters name by checking voter. Administrator will validate the client by confirming the client's personality verification and after that administrator will enlist the voter. The framework will permit the client to vote in favor of one time for a specific race. Administrator can include any number of applicants when the new decision will be declared.

We will be using 2 hardware modules.

2.3.1 Finger print reader

Unique finger impression reader will be joined to the PC in the surveying station to perceive the individual on the unique finger impression bases. The U.are.U 4500 Reader [4] is a USB novel stamp reader including a rich, smooth arrangement with a fragile, cool blue glimmer and, clearly, the unsurpassable execution Crossmatch is known for. Made for power-customers and shared circumstances, the U.are.U 4500 is the typical choice for the people who need and need the most perfect. The U.are.U 4500 Peruser utilizes optical one of a kind finger impression analyzing advancement for common picture quality and thing reliability. The blend of the U.are.U 4500 Unique check Reader with the FingerJet organizing engine makes an unmatched ability to see even the most troublesome fingerprints.

U 4500 Finger Print Reader

2.3.2 Computer

A PC [5] is an electronic gadget that controls data, or information. It can store, recover, and prepare information. You may definitely realize that you can utilize a PC to sort archives, send email, play recreations, and peruse the Internet. You can likewise utilize it to alter or make spreadsheets, introductions, and even recordings. Before we discuss distinctive sorts of PCs, how about we discuss two things all PCs have in like manner: equipment and programming. Equipment is any piece of your PC that has a physical structure, for

example, the console or mouse. It additionally incorporates the majority of the PC's inward parts, which you can find in the picture beneath. Programming is any arrangement of directions that instructs the equipment and how to do it. Cases of programming incorporate web programs, amusements, and word processors. Beneath, you can see a picture of Microsoft PowerPoint, which is utilized to make introductions. Mac PC The Mac PC was presented in 1984, and it was the principal generally sold PC with a graphical UI, or GUI (articulated gooey). All Macintoshes are made by one organization (Apple), and they quite often utilize the Macintosh OS X working framework.

Mac PC

2.4 Future Plan

The system that is made is going to get updated with the passage of time, the voting system is very useful and applicable in our real world, and it has the capacity to solve the problems of countries or organizations where opinion of humans is to be quantified. Distributed database will optimize the searching time and will benefit the organizations using the system. The database Is further made on the cloud which makes this system more portable and easy accessible and this also gives a secure database and hacking is not easy on cloud database. Data is easy to recover and the candidates' profiles can also be used in the other part of countries where recognition of the voter is necessary.

2.5 Research Work

We have studied many documents related to rental car system, some of the references are as below these documents helped us in planning how to develop our system. We observed the current working systems related to our project and looked at the drawbacks in the current working systems.

Chapter 3

Requirement Specifications

3.1 System Analysis

In the life of the software development, problem analysis provides a base for design and development phase. The problem is analyzed so that sufficient matter is provided to design a new system. Large problems are sub-divided into smaller once to make them understandable and easy for finding solutions. Same in this project all the task is sub-divided and categorized.

3.2 Requirements Analysis

The following section presents the complete set of functional and non-functional requirements identified for smart move. Functional requirements are listed first, according to their relationship to the overall system. The non-functional requirements that pertain to safety, security, accuracy, reliability, accessibility, usability, maintenance and performance are subsequently presented.

3.2.1 Functional Requirements

The functional requirements of the system describe the functionality or services that the system is expected as provide.

- Registration
  Admin will create user account to use EVS.
- Sign in
  User(admin,super admin)will have to give a user name and password to make certain changes.

- Sign out
  User will sign out after his vote is cast.
- Add candidate Profile
  Super admin can add candidate profile.
- View candidate Profile.
  Super admin can view candidate profile.
- Delete Update candidate Profile.
  Super admin can delete and update view candidate profile.
- Search candidate Profile.
  Super admin can search candidate profile.
- Add,delete,update Voter information.
  Super admin can add,delete or update voter information.
- View voter profile.
  Super admin can view voter profile using EVS.
- Add new election.
  Using EVS super admin can add new election details in database.
- Add,delete,update poling station Details.
  Super admin can add, delete or update the information related to the polling stations.
- Search poling stations.
  Super admin can search poling station details via EVS.
- Check voting status.
  Super admin can check voting status of the candidate via EVS.
- Check search results.
  Admin can search the results of elections using EVS.
- Vote cast
  Super admin,Voter and Admin can caste their vote using EVS biometric system.
- Generate Report.
  System will generate report after the voting is closed.

3.3 Non-Functional Requirements

Non-functional requirements are the quality requirements that stipulate how well a software does what it has to do. These are quality attributes of any system; these can be seen at the execution of the system and they can also be the part of the system architecture.

3.3.1 Accuracy

The design architecture basis makes sure that the system is accurate and reliable. The alternative ways for a solution will be presented by the software in case of even a little inaccuracy.

3.3.2 Usability

The proposed system is simple with a user-friendly interface. The users will be comfortable to communicate with the system.

3.3.3 Accessibility

This system will be physically existent and will be easily identifiable in a polling station. There will be no problem of recognition.

3.3.4 Performance

When functioning, the system will be at its best performance level.

3.3.5 Reliability

It is reliable in all conditions and if a problem occurs, it will be effectively handled.

3.3.6 Security

The proposed system will be very secured every user will be required registration and CNIC-number/finger print to use the system. The system will do the proper authorization and verification of the users based on their types and their necessities. The proposed system will be designed persistently to avoid any misuse of the application. The proposed is sufficiently secured. It will require the CNIC number/fingerprint to allow the access to the system. Proper authorization and verifications of users will be

done by the system. The persistently designed system will elude any kind of misuse of the technology.

3.4 Software And Hardware Requirements

3.4.1 Software Requirements

Following software are used in development of Biometric Voting System application.

- Language C-Sharp.
- Visual studio 2015.
- Microsoft SQL database.

3.4.2 Hardware Requirements

The recommended hardware specified by the respective software would suffice the needs. The memory and processing power needed would increase as the number of users increase. The estimated hardware requirements are as specified.

- Finger print reader
- Computers

3.4.3 Server Requirements

The minimum hardware as recommended by all of the software required on server side say operating system and development software

- Quad core processor with processing speed of 1.6 GHz/Core.
- 4 GB RAM.
- Windows 7 or above operating system

3.5 Use Cases

use case diagram is a graphical representation that describes how users will interact with the system. The following are the four actors of EVS.

- Voter
- Super Admin

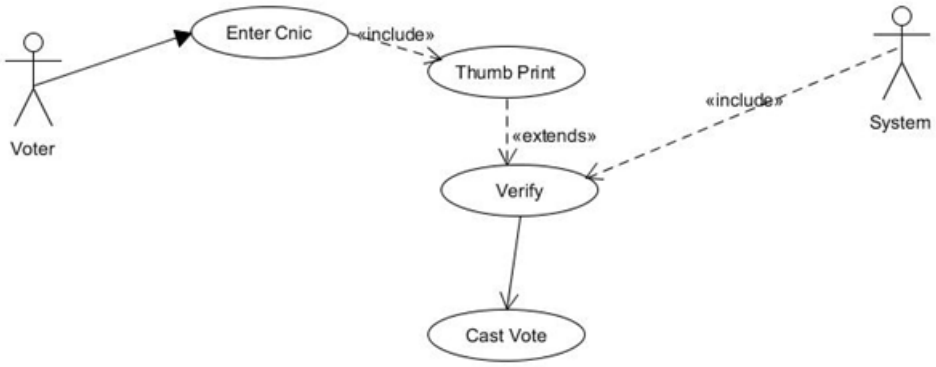

Figure 3.1: Use case 01 Actor : Voter

- Admin
- System

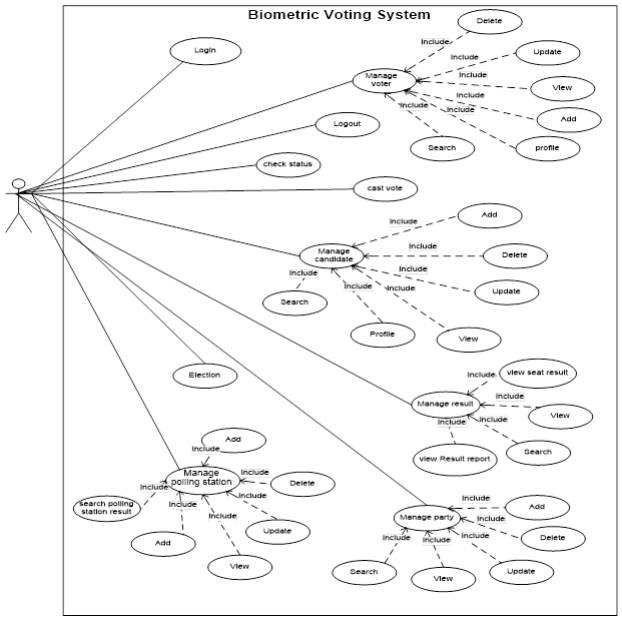

Figure 3.2: Use case super Admin

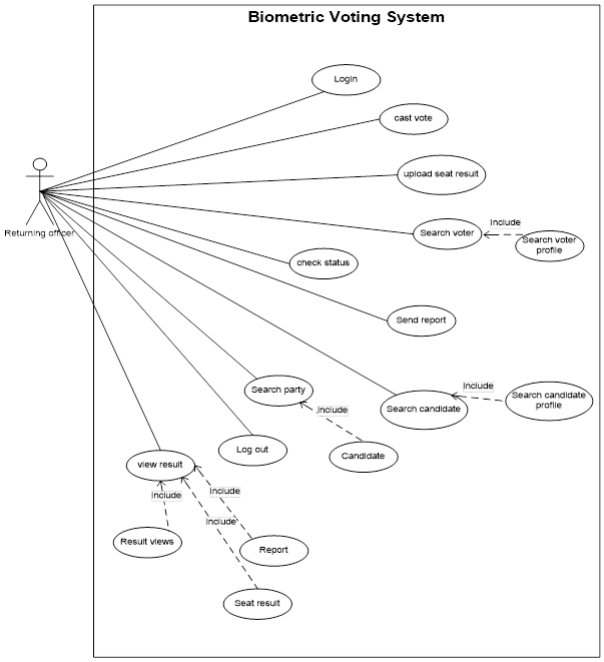

Figure 3.3: Use case Admin

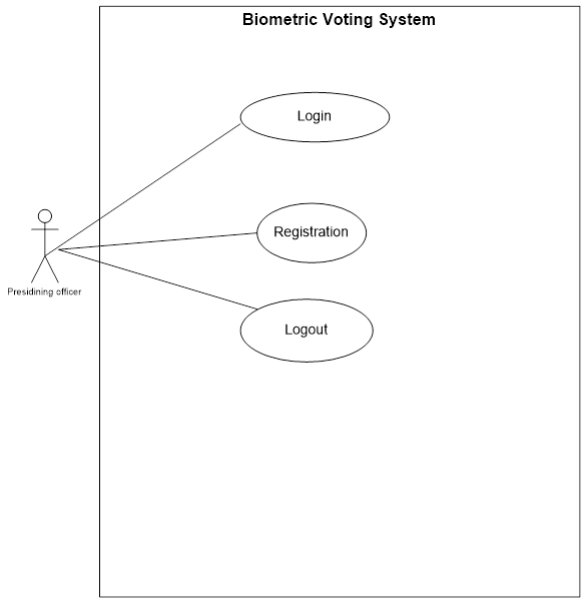

Figure 3.4: Use case Admin

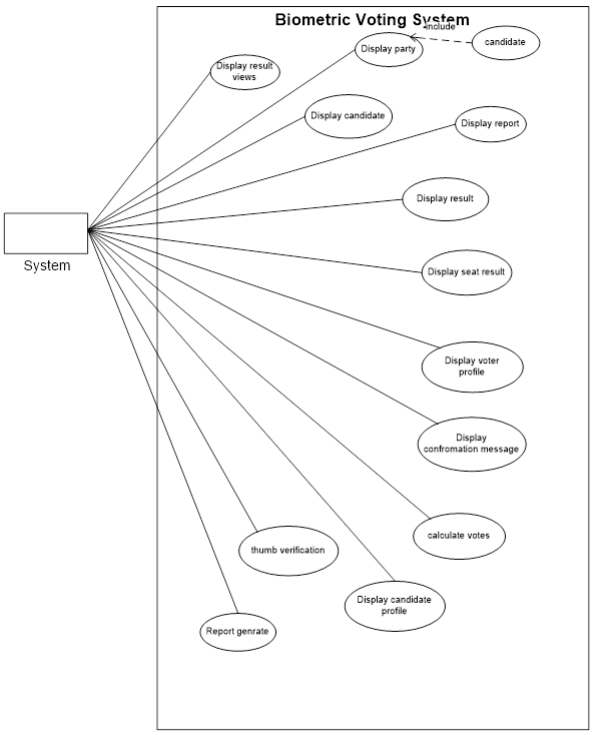

Figure 3.5: Use case system

Use Case Id	UC-1
Use Case Name	Candidate
Scope	Software level
Level	User Goal
Primary Actor	Super Admin
Pre-Condition	Actor should login
Post Condition	Actor successfully Login
Main Success Scenarios	**Actor Action** 1) Actor requests to system to view candidate profile information. 2) Actor enter detail like Candidate id. Candidate name. **System Action** 1)System ask to enter following detail Candidate id. Candidate name. 2) System check detail and display voter profile.

Table 3.1: Use Case: Candidate Specification Table

Use Case Id	UC-2
Use Case Name	Political Party
Scope	Software level
Level	User Goal
Primary Actor	Super Admin
Pre-Condition	Actor should login
Post Condition	Actor successfully Login
Main Success Scenarios	**Actor Action** 1) Actor requests to system to view Party information. 2) Actor enter detail like Party id. Party name. Candidate id Candidate name **System Action** 1)System ask to enter following detail Party id. Party name. Candidate id Candidate name 2)System checks the detail and display Party info.

Table 3.2: Use Case: Political Party Specification Table

Use Case Id	UC-3
Use Case Name	Report
Scope	Software level
Level	User Goal
Primary Actor	Super Admin
Pre-Condition	Actor should login
Post Condition	Actor successfully Login
Main Success Scenarios	**Actor Action** 1) Actor requests to system to view result report. **System Action** 1)System display result report.

Table 3.3: Use Case: Report Specification Table

Use Case Id	UC-4
Use Case Name	Manage Result
Scope	Software level
Level	User Goal
Primary Actor	Super Admin
Pre-Condition	Actor should login
Post Condition	Actor successfully Login
Main Success Scenarios	**Actor Action** 1) Actor requests to system to view result information. **System Action** 1) System display result.

Table 3.4: Use Case: Manage Result Specification Table

Use Case Id	UC-5
Use Case Name	Voter
Scope	Software level
Level	User Goal
Primary Actor	Super Admin
Pre-Condition	Actor should login
Post Condition	Actor successfully Login
Main Success Scenarios	**Actor Action** 1) Actor requests to system to view voter profile information. 2) Actor enter detail like Voter id. Voter name. CNIC **System Action** 1)System ask to enter following detail Voter id. Voter name. CNIC 2)System checks the detail and display voter profile.

Table 3.5: Use Case: Voter Specification Table

Use Case Id	UC-6
Use Case Name	Manage Candidate
Scope	Software level
Level	User Goal
Primary Actor	Super Admin
Pre-Condition	Actor should login
Post Condition	Actor successfully Login
Main Success Scenarios	**Actor Action** 1) Actor requests to system to add candidate information. 2) Actor enter detail like Candidate id. Candidate name. CNIC Father name Thumb Print Party Sign **System Action** 1) Actor enter detail like Candidate id. Candidate name. CNIC Father name Thumb Print Party Sign 2)System checks the detail and then successfully add candidate info.

Table 3.6: Use Case: Manage Candidate Specification Table

Use Case Id	UC-7
Use Case Name	Manage Party
Scope	Software level
Level	User Goal
Primary Actor	Super Admin
Pre-Condition	Actor should login
Post Condition	Actor successfully Login
Main Success Scenarios	**Actor Action** 1) Actor requests to system to add Party information 2) Actor enter detail like Party id. Party name. Party Sign **System Action** 1) Actor enter detail like Party id. Party name. Party Sign 2)System checks the detail and then successfully add party info.

Table 3.7: Use Case: Manage Party Specification Table

Use Case Id	UC-8
Use Case Name	Manage Polling Station
Scope	Software level
Level	User Goal
Primary Actor	Super Admin
Pre-Condition	Actor should login
Post Condition	Actor successfully Login
Main Success Scenarios	**Actor Action** 1) Actor requests to system to add Polling station information 2) Actor enter detail like Polling Station id. City Location District **System Action** 1) Actor enter detail like Polling Station id. City Location District 2)System checks the detail and then,successfully add polling station info.

Table 3.8: Use Case: Manage Polling Station Specification Table

Use Case Id	UC-9
Use Case Name	Manage Result
Scope	Software level
Level	User Goal
Primary Actor	Super Admin
Pre-Condition	Actor should login
Post Condition	Actor successfully Login
Main Success Scenarios	**Actor Action** 1) Actor requests to system to search result information 2) Actor enter detail like Polling Station id. City District Result id **System Action** 1) Actor enter detail like Polling Station id. City District Result id 2) System checks,the detail and then successfully search result.

Table 3.9: Use Case: Manage Result Specification Table

Use Case Id	UC-10
Use Case Name	Manage Voter
Scope	Software level
Level	User Goal
Primary Actor	Super Admin
Pre-Condition	Actor should login
Post Condition	Actor successfully Login
Main Success Scenarios	**Actor Action** 1) Actor requests to system to add voter information 2) Actor enter detail like Voter id. City District CNIC Father Name **System Action** 1) Actor enter detail like Voter id. City District CNIC Father Name 2) System checks the detail and then successfully add voter info.

Table 3.10: Use Case: Manage Voter Specification Table

Use Case Id	UC-11
Use Case Name	Cast Vote
Scope	Software level
Level	User Goal
Primary Actor	Super Admin
Pre-Condition	Actor should login
Post Condition	Actor successfully Login
Main Success Scenarios	**Actor Action** 1) Actor requests to system to show candidates party symbols 2)Actor select the Party symbol like PML(N) PTI PPP **System Action** 1) System ask to select the Party symbol like PML(N) PTI PPP 2)System save the confirmation.

Table 3.11: Use Case: Cast Vote Specification Table

Use Case Id	UC-12
Use Case Name	View Candidate
Scope	Software level
Level	User Goal
Primary Actor	Super Admin
Pre-Condition	Actor should login
Post Condition	Actor successfully Login
Main Success Scenarios	**Actor Action** 1) Actor requests to system to view candidates **System Action** 1)System display candidates.

Table 3.12: Use Case: View Candidate Specification Table

Use Case Id	UC-13
Use Case Name	Check Status
Scope	Software level
Level	User Goal
Primary Actor	Super Admin
Pre-Condition	Actor should login
Post Condition	Actor successfully Login
Main Success Scenarios	**Actor Action** 1) Actor requests,to system to check status 2) Actor enter detail like Voter id **System Action** 1)System ask to enter following detail Voter id 2)System checks the detail and display voter status.

Table 3.13: Use Case: Check Status Specification Table

Use Case Id	UC-14
Use Case Name	Log-In
Scope	Software level
Level	User Goal
Primary Actor	Super Admin
Pre-Condition	Actor should have a valid username and password.
Post Condition	Actor successfully Login
Main Success Scenarios	**Actor Action** 1) Actor requests to login 2) Actor provides the asked information 3) Actor request the system to proceed **System Action** 1)System ask for the following information User name Password

Table 3.14: Use Case: Log-In Specification Table

Chapter 4

Design

4.1 Class Diagram

The class diagram is a static diagram. It represents the static view of an application. Class diagram is not only used for visualizing, describing and documenting different aspects of a system but also for constructing executable code of the software application. The class diagram describes the attributes and operations of a class and also the constraints imposed on the system. The class diagrams are widely used in the modelling of object oriented systems because they are the only UML diagrams which can be mapped directly with object oriented languages. The class diagram shows a collection of classes, interfaces, associations, collaborations and constraints. It is also known as a structural diagram.The figure figure 4.1 shows the class diagram.

4.2 Entity-Relation Diagram

An entity relationship diagram (ERD) shows the relationships of entity sets stored in a database. An entity in this context is a component of data. In other words, ER diagrams illustrate the logical structure of databases. At first glance an entity relationship diagram looks very much like flowchart. It is the specialized symbols, and the meanings of those symbols, that make it unique. The figure figure 4.2 shows the entity relation diagram.

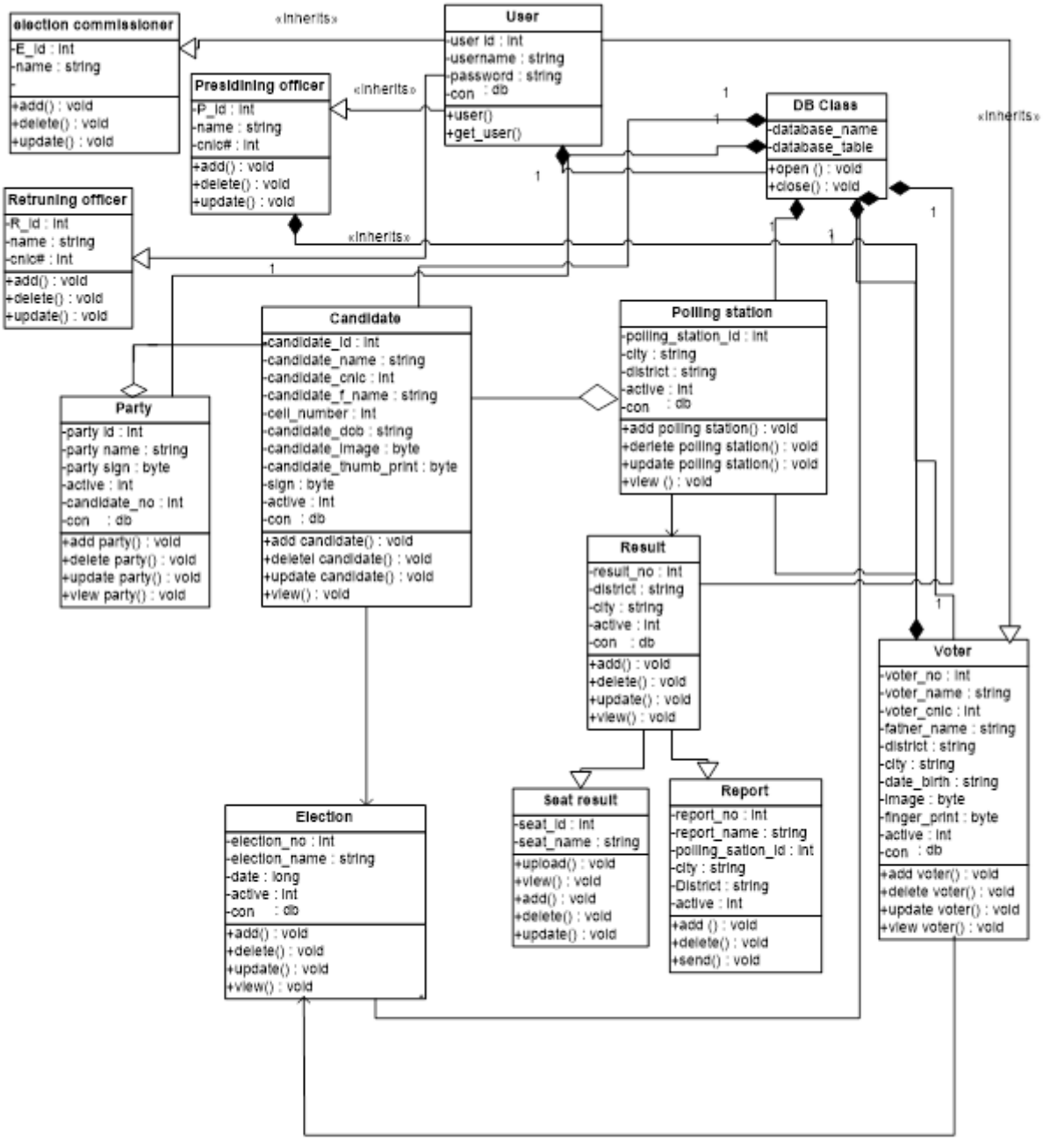

Figure 4.1: Class Diagram

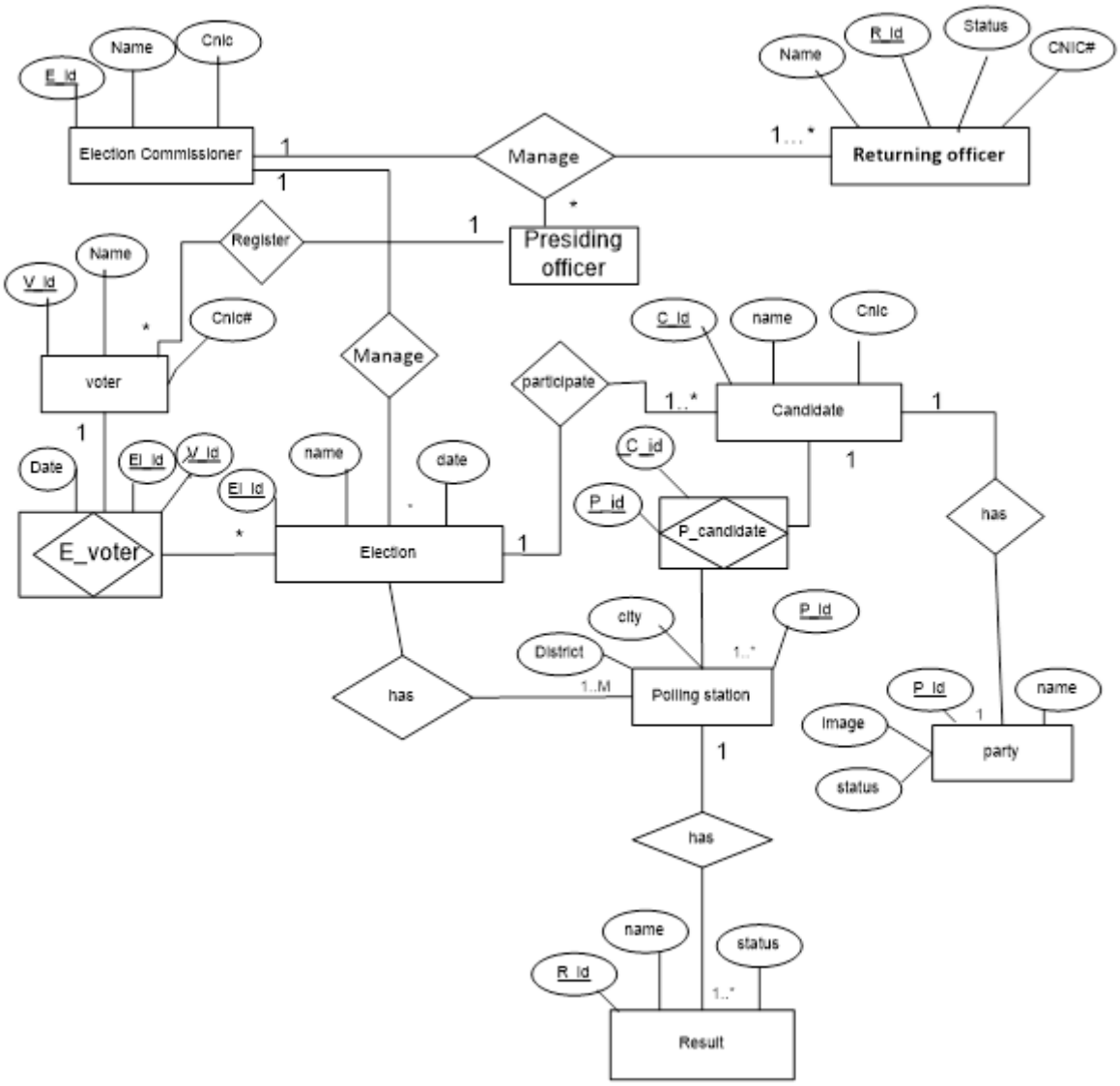

Figure 4.2: Entity Relation Diagram

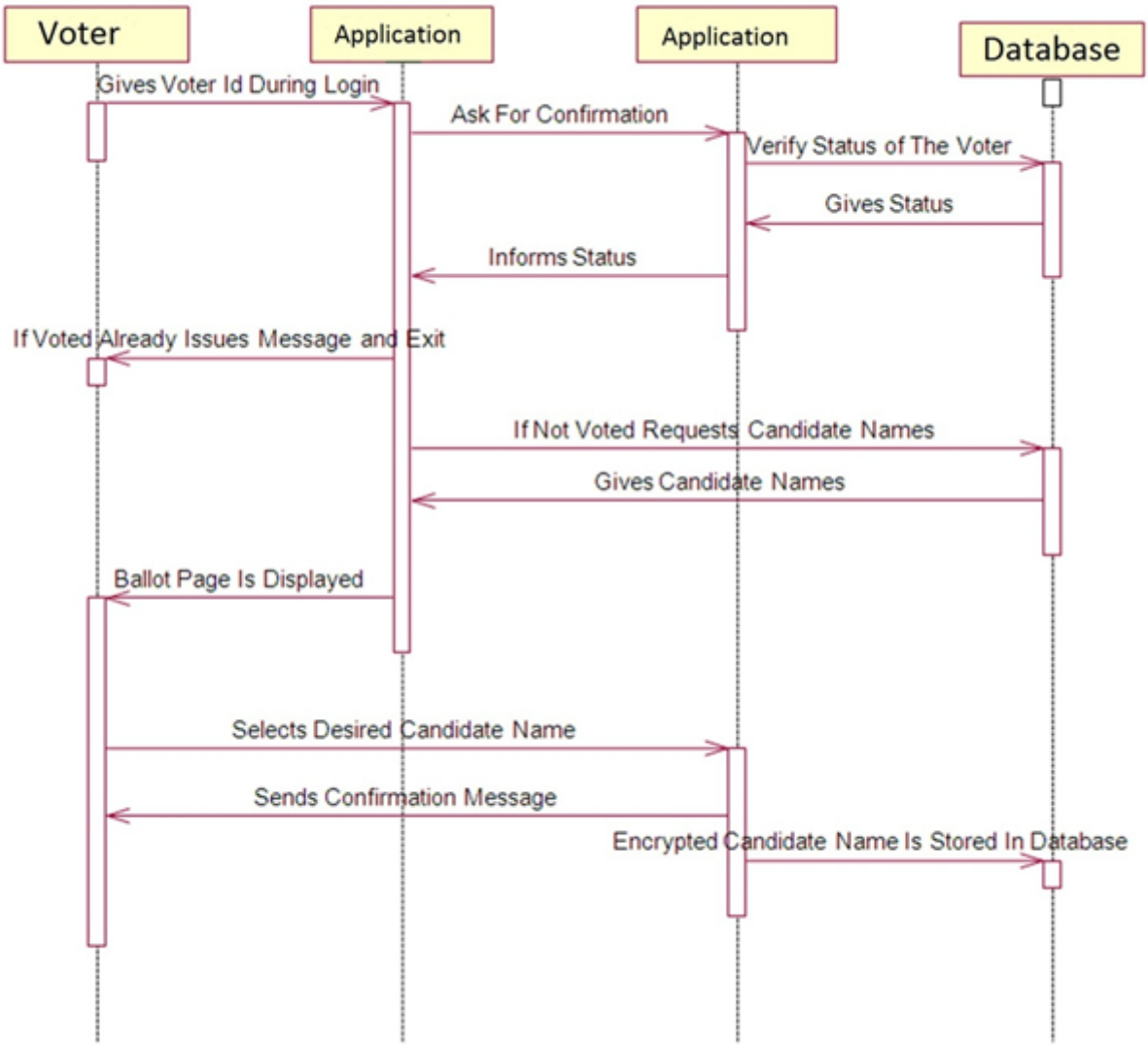

Figure 4.3: Sequence Diagram

4.3 Sequence Diagram

The figure figure 4.3 shows the sequence diagram.

4.4 Data Flow Diagram

The figure figure 4.4 shows the data flow diagram.

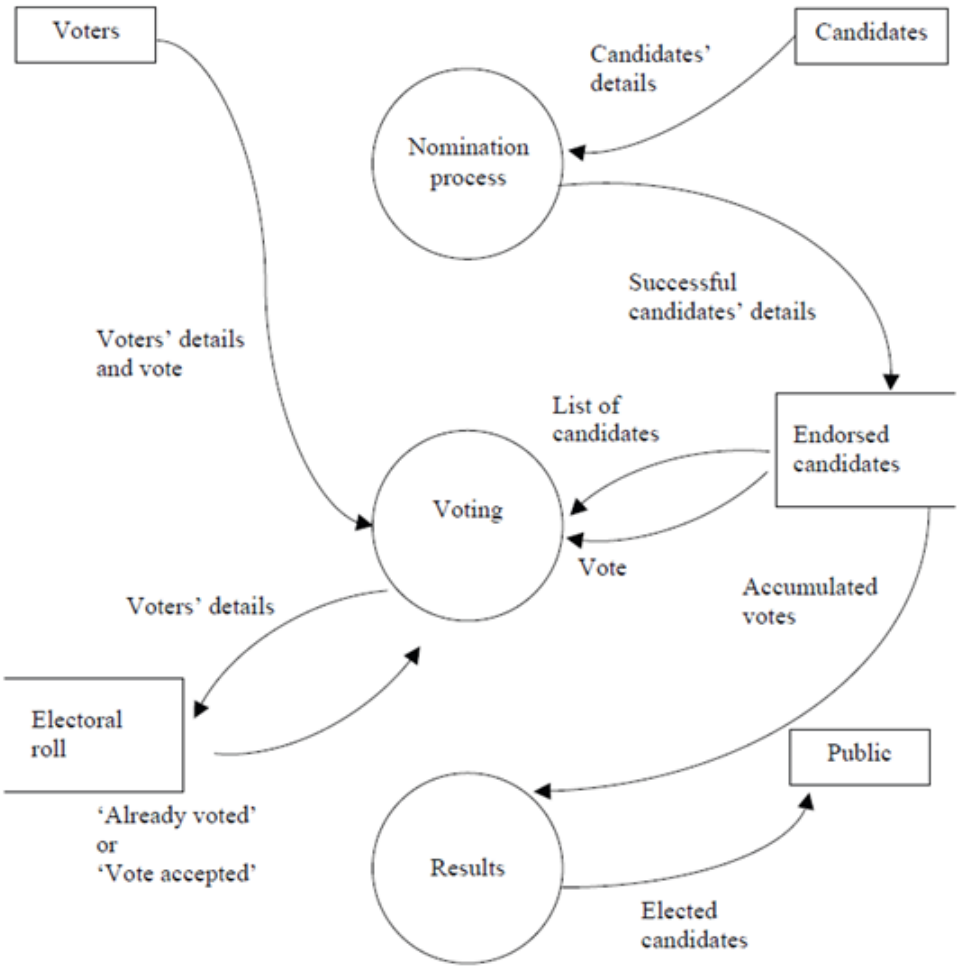

Figure 4.4: Data Flow Diagram

Chapter 5

System Implementation

5.1 Objective

This chapter outlines the detailed description of all the tools techniques methods and different techniques used in implementing the system, the implementation of our system is the exploration of cloud benefits along with integration techniques to enhance data security.

5.2 System Components

As mentioned in this section the project relies on interfacing between numbers of different components. In this section we will discuss the components of our system individually.

5.3 Tools and Technologies

There are many tools and technologies used for the implementation of given system details of which are as follows:

5.3.1 Integrated Development Environment

Visual Studio

Visual Studio is a suite of utilizations made by Microsoft to give creators a convincing enhancement condition for the Windows and .NET stages. Visual Studio [6] can be

used to compose ease applications, Windows applications, Windows administrations, Windows Portable applications, ASP.NET applications, and ASP.NET web managements, in your choice of C++, C-Sharp, VB.NET, J, and the sky is the boundary from there. Visual Studio similarly incorporates various extra improvement devices, for example, Visual SourceSafe; which tools are incorporated depends meaningfully on the version of Visual Studio that you are using.

Features

The greater part of the above applications could be composed utilizing another IDE or some blend of openly accessible SDKs and your most loved content manager, so why might you pay for Visual Studio? Visual Studio is committed to making your advancement life simpler through efficient and advantageous elements; here are probably the most convincing of those elements.

IntelliSense:

IntelliSense is the trademark highlight of Visual Studio. IntelliSense basically helps you while programming by demonstrating to you the accessible classes and the techniques and properties accessible on those classes. Can't recollect what the name of that class, strategy, or property is? No stresses, IntelliSense will assist. **Planners:**

Visual Studio incorporates visual WSYIWYG originators for Windows applications, ASP.NET applications, and Windows Versatile applications. These fashioners make it significantly less demanding to get your application looking perfectly. **Investigating:**

A standout amongst the most imperative components of Visual Studio is the capacity to venture through your application line by line as it is executing. Not certain why you are getting a mistake? Just stroll through and see precisely what is turning out badly. **Association:**

Visual Studio is worked for creating applications, so it gives instinctive strategies to arranging your different code records into ventures and your different activities into arrangements. Visual Studio incorporates much excessively numerous components to be recorded here; even most prepared engineers don't make utilization of the majority of the different elements accessible in Visual Studio.

C-Sharp Language C-Sharp [7] is an object-oriented programming language from Microsoft that expects to consolidate the computing power of C++ without breaking a sweat of Visual Basic. C-Sharp depends on C++ and contains highlights like those of Java.C-Sharp is intended to work with Microsoft's .Net stage. Microsoft's point is to encourage the trading of data and administrations over the Web, and to empower engineers to manufacture exceptionally convenient applications. C-Sharp disentangles programming through its utilization of XML and SOAP which permit access to a programming object or strategy without requiring the software engineer

to compose extra code for each progression. Since software engineers can expand on existing code, instead of over and again copying it, C-Sharp is relied upon to make it quicker and more affordable to get new items and administrations to showcase.

Microsoft is working together with ECMA, the global gauges body, to make a standard for C-Sharp. Universal Standards Organization (ISO) acknowledgment for C-Sharp would urge different organizations to build up their own particular forms of the language. Organizations that are as of now utilizing C-Sharp incorporate Apex Software, Bunka Orient, Component Source, devSoft, FarPoint Technologies, LEAD Technologies, ProtoView, and Seagate Software.

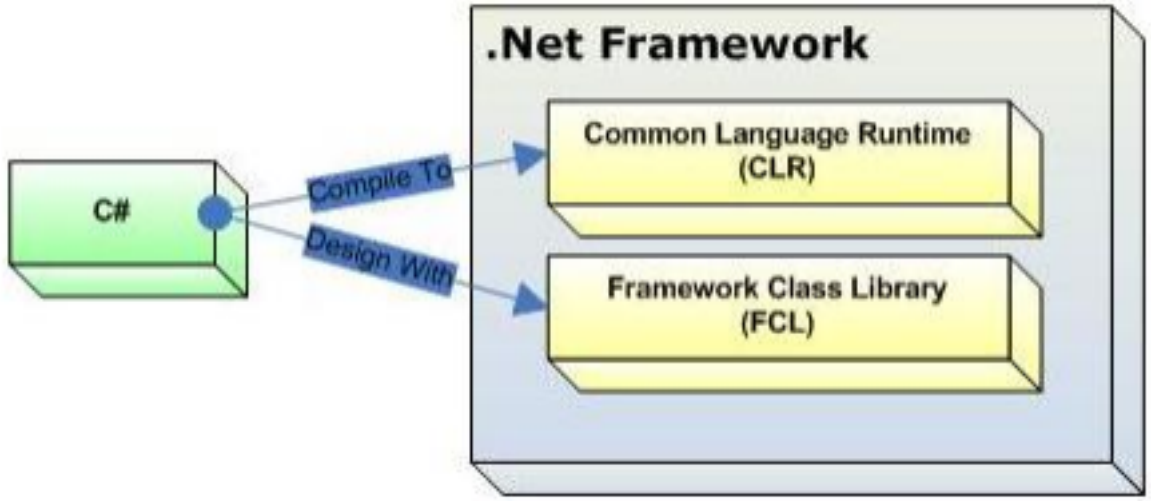

Figure 5.1: .Net Framwork

Chapter 6

System Testing and Evaluation

In this chapter various testing techniques are used for the evaluation of this application. Testing is the main part of any application, it provides the validation about the requirements and the working of the application. Every projects has its limitations and these limitations will be explored during the test cases that will be discussed in this chapter.

6.1 Objective

Software testing is an empirical technical investigation conducted to provide stakeholders with information about the quality of the product or service under test, with respect to the context in which it is intended to operate. System testing is an essentials step for the development of the reliable and error free system. Testing is the process executing a problem with the explicit intention of finding errors i.e. making the problem fail and test cases are devised with the purpose in mind. A test case is a set of data items that the system processes as normal input. A successful test is one that has a high probability of finding an as-yet undiscovered error. Testing involves exercising the program using data like the real processed by the program. Testing may be carried out during the implementation phase, to verify if the software behaves as intended by its designer, or after the completion of its implementation phase. There are many approaches to software testing.

- Unit testing
- Interface testing
- Integration testing

- Module testing

6.2 Unit Testing

Each and every module of the system was tested at individual component level to ensure that system operates correctly. Testing of these modules involved various steps:

- Validation checks were confirmed on each item after the data was entered.
- Functionality of each button was successfully tested.

6.3 Interface Testing

Interface testing ensures that proper links are operational and everything is displayed according to the requirement of the system. Interface testing involved many steps: Fonts size and font name were checked against the guidelines laid by the University. It was checked that every meaningful word in prompt/any alert message displayed started with a capital letter.

6.4 Module Testing

A module is a collection of dependent components. In module testing, related units are integrated in a module and tested for their proper functionality together. Various modules were tested, by passing data/signal between them.

6.5 Integration Testing

All the components module of the system was put to integrated testing and were found working successfully.

6.5.1 Evaluation

Evaluation of the system means to examine what goals are achieved by the system and what are the weaknesses and the deficiencies left behind. Evaluation is the final step in the development by any system. This phase is for the purpose of reviewing whether objectives and functional requirements of the Univ. are fulfilled is not.

6.5.2 Achievements

- Software provides the password protected GUI to facilitate the administrator to manage this system.
- In all modules of the system, data is properly add, delete and update.
- All verification and validation checks work properly.
- System is satisfying almost all of its major specifications and functionality and it can be concluded that system is satisfying its more than 90 percent scope

6.6 System Testing

System testing is an essential step for the development of the reliable and error free system. Testing is the process executing a problem with the explicit intention of finding errors i.e. making the problem fail and test cases are devised with the purpose in mind. A successful test is one which does not find an error

Test Case Id: TC-BVS-001	**Test Item:**User Authentication
Author: Faraz	**Doc Date:** 4 May 2017
Test Type: Manual Black Box	**Test Case Name:**Admin Login
Component: User Authentication facilty	**Release Version:**1.0
Test Case Description	The test case will determine the current functionality of user authentication
Pre-Condition User should have his own username and password	**Post Condition** System successfully authorized the user to use system.
Actual Input Data/Event	**Actual Output Data/Event**
Enter “Qasim” as username and “123456” as password.	Successfully login.
Enter “admin” as username and “12345” as password.	Login Failed
Test Case Result	Test is performed successfully.

Table 6.1: Test Case: Log-In Specification Table

Test Case Id: TC-BVS-002	**Test Item:**Manage Voter
Author: Faraz	**Doc Date:** 4 May 2017
Test Type: Manual Black Box	**Test Case Name:**Delete Voter
Test Case Description	The test case will determine the current functionality of user authentication
Pre-Condition User should have login successfully.	**Post Condition** System successfully authorized the user to use system.
Actual Input Data/Event	**Actual Output Data/Event**
Select the voter.Click on “Delete” button.	System delete the voter successfully.
Test Case Result	Test is performed successfully.

Table 6.2: Test Case: Manage Voter Specification Table

Test Case Id: TC-BVS-003	**Test Item:**Manage Party
Author: Faraz	**Doc Date:** 4 May 2017
Test Type: Manual Black Box	**Test Case Name:**Add Party
Test Case Description	The test case will determine the current functionality of add party.
Pre-Condition User should have login successfully.	**Post Condition** System successfully authorized the user to use system.
Actual Input Data/Event	**Actual Output Data/Event**
Enter “ppp” as name Click on “save” button.	System successfully adds the party.
Click on “save” button.	System show the error message that "Name is not entered”.
Test Case Result	Test is performed successfully.

Table 6.3: Test Case: Add Party Specification Table

Test Case Id: TC-BVS-004	**Test Item:**Manage Candidate
Author: Faraz	**Doc Date:** 4 May 2017
Test Type: Manual Black Box	**Test Case Name:**Delete Candidate
Test Case Description	The test case will determine the current functionality of delete candidate.
Pre-Condition User should have login successfully.	**Post Condition** System successfully authorized the user to use system.
Actual Input Data/Event	**Actual Output Data/Event**
Select the Candidate Click on “Delete” button	System delete the Candidate successfully
Test Case Result	Test is performed successfully.

Table 6.4: Test Case: Delete Candidate Specification Table

Chapter 7

Conclusions

The science of fetching biological features of a human with an automated mechanism to authenticate a person is called Biometrics. In biometric products, the requirement of passwords or PINs should be removed. Smart card and information i.e. PIN are two factors of authorization. Biometric system uses a distinct feature of fingerprint. And fingerprint recording in a system is fast and comfortable. In contrast to the previous methods like pin codes or passwords, features of a biometric system are adaptive i.e. they adapt to change over the period of time. This intuitive property of biometric system make is stand out. It makes a balance between the too strict and too loose approach i.e. the strict check has a large number of refusals and the loose check produces many wrong accepts. Biometric system balances the two approaches which makes it more accurate. Overlooking security, e-Voting systems can use biometric user verification. However: Is this necessary? Is it worth the effort and are the security risks controllable? We cannot give an answer to these questions within the spectrum of this project; we also cannot give an answer to these questions that is altogether applicable. The main inference of this project is that biometric approaches for e-Voting systems should be very carefully deployed. Currently, the denial rates are just too high for an environment as sensitive as electronic votes.

Properties that have to be improved include:

- False accept rate
- False reject rate
- Defense against spoofing attacks
- Judicial aspects regarding access to biometric templates

7.1 Future Enhancements

The future improvements should be possible by incorporating taking after measurements into the framework which will give secure outcomes and the framework will acquire trust of the legislatures/associations/individuals

7.1.1 Iris

Another static resources of people are eyes. One can either utilize photos of the individual's iris or utilize a retina scanner that outputs veins to produce individual informational collection.

7.1.2 Face

The human face is additionally an element that can be utilized by biometric frameworks. Human face acknowledgment by analyzing the size and position of different facial components is being pushed for use at a few airplane terminals to expand security. Another conceivable approach is to make infrared recordings and dissect the subsequent facial thermogram.

7.1.3 Voice

A more intuitive individual part of people are their voices. Everyone has an exceptional mode and tone while discourse. Voice acknowledgment tries to examine these components and utilize them to perceive a man [html2].

7.1.4 Signature

Another behavioral normal for a man serviceable by biometrical investigations is the mark. The frame as well as the dynamic viewpoints can be viewed as an arrangement of elite components of a man. Other conceivable portable biometric info could be the pace and attribute.

7.1.5 DNA analysis

Presently this is a fairly more hypothetical thought for biometric qualifications. Envision a DNA peruser that can make an entire DNA examination inside seconds from only a couple of cells of a man's body. Such a gadget would certainly be a match to, e.g. a unique finger impression peruser, while relating the nature of the outcomes.

7.1.6 Multi-Biometric Systems

As a final approach to biometric data assembly, one can combine two or more actual biometric analyses and combine their results, i.e. use more than one uni-biometric system. This mixture yields better results than each of the joint analyses individually and thereby increases the trustworthiness of the biometric system.

References

[1] Gloria Lin and Nicole Espinoza. *Stanford University*. 2007. Cited on p. 5.

[2] Gloria Lin and Nicole Espinoza. *Stanford University*. 2007. Cited on p. 5.

[3] IDAYAT HASSAN and SHAMSUDEEN YUSUF. *Case Study Nigeria*. 2015. Cited on p. 6.

[4] http://www.crossmatch.com/UareU4500Reader/. Cited on p. 7.

[5] https://www.gcflearnfree.org/computerbasics/what-is-a computer/1/. Cited on p. 7.

[6] https://www.visualstudio.com/downloads/. Cited on p. 30.

[7] https://docs.microsoft.com/en us/dotnet/articles/csharp/csharp. Cited on p. 31.