

IEM

(Interactive Electoral Map)



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ABSTRACT

The existing infrastructure of Election Commission of Pakistan doesn't have the provision of a complete Electoral Constituency Map. The current available maps are in the form of fragments (city wise images) uploaded on the website which provide no real use of the available data on them. The maps need to be integrated onto a single Pakistan map showing the basic division of the constituencies along with other useful attributes/data related to the topic.

Our project would integrate all available data regarding the constituencies of Pakistan onto a single map. The user will be able to interact with the maps viewing the exact distributions of constituencies and relatable details regarding them.

The project targets on creating an interactive electoral map, explicitly exhibiting the dissemination of constituencies of the national assembly and integration of pertinent data. Following salient features are also provided:

- Digitized constituency map
- Interactive mapping for the users
- Transforming electoral data onto a single map and actionable information
- Integrating constituencies onto a single map
- Smart mapping and annotation use
- Show constituency wise data of past election results

CERTIFICATE FOR CORRECTNESS AND APPROVAL

It is certified that the work contained in the thesis IEM (Interactive Electoral Map) is carried out by Capt Muhammad Masab, Capt Taimoor Riaz, Capt Abdullah Kamran and Capt Muhammad Zeeshan under supervision of Maj Sohaib Khan for partial fulfillment of Degree of Bachelor of Software Engineering is correct and approved.

Approved By:

Signature: _____

Major Sohaib Khan
Department of IS, MCS

DECLARATION

It is hereby declared that we developed this Web based application and also this report by our own personal efforts. No portion of this work has been published or submitted for any other qualification elsewhere.

DEDICATION

The project is dedicated to our families and parents, whose support made possible. And also to our Project Supervisor Major Sohaib Khan whose advice and guideline helped us throughout the project.

ACKNOWLEDGEMENTS

Our humble gratitude to Allah Almighty who gave us the strength, guidance, the will to succeed and the health to achieve our goals in time.

We are grateful to our family for their continued support always

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We are also thankful to all the faculty of Computer Software Department of Military College of Signals for teaching us and making us learn our curriculum.

Table of Contents

Chapter 01	1
INTRODUCTION.....	1
1. Introduction.....	2
1.1 Problem Statement	2
1.2 Proposed Solution	2
1.3 Project Scope	2
1.4 Definitions, Acronyms & Abbreviations	3
1.5 Intended Audience & Reading Suggestions	5
Chapter 02	6
Software Requirement Specification	7
2. Software Requirement Specification.....	7
2.1 Methodology	7
2.2 Functionalities	7
2.2.1 Functional Requirements	7
2.2.2 Non-functional Requirements	7
2.2.2.1 Performance requirements	7
2.2.2.1.1 Response Time	7
2.2.2.1.2 Startup Time	8
2.2.2.2 Graphical User Interface	8
2.2.2.3 Portability	8
2.2.2.4 Availability	8
2.2.2.5 Usability	8
2.3 Users	8
2.4 Operating Environment	9
2.5 External Interface Requirements	9
2.5.1 User Interface	9
2.5.2 Hardware Interface	9
2.5.3 Software Interface	9
2.6 Other non-functional Requirements	10
2.6.1 Performance Requirements	10
2.6.2 Software Quality Attributes	10
Chapter 03	11
3. System Design	12
3.1 Use Case Model	12
3.1.1 Use Case Diagram	13

IEM - Interactive Electoral Map

3.1.2	Use Case Description	14
3.2	System Sequence Diagrams	19
3.2.1	Map	19
3.2.2	District Wise Map	20
3.2.3	Party Wise map	20
3.2.4	General Election Result	21
3.2.5	MNA Detail	21
3.3	Domain Model	22
3.4	Activity Diagram	23
3.5	ER Diagram	24
3.6	Enhanced ER Diagram	25
3.7	Logical ER Diagram	26
Chapter 04		27
4.	Implementation	28
4.1	Project Screenshots	28
4.1.1	Home Page	28
4.1.2	Map	29
4.1.3	Map (Selecting a specific NA)	30
4.1.4	District Wise Map	30
4.1.5	District Wise Map (selecting a specific district)	31
4.1.6	Party Wise Map	31
4.1.7	Party Wise Map (selecting a specific party)	32
4.1.8	MNA Profile Details.....	32
Chapter 05		33
5.	Testing	34
5.1	Test Case TC-01: Map	34
5.2	Test Case TC-02: District Wise Map	35
5.3	Test Case TC-03: Party Wise Map	36
5.4	Test Case TC-04: General Election Result	37
5.5	Test Case TC-05: MNA Details	38
5.6	Summary	39
Chapter 06		40
6.	Conclusion	41
6.1	Achievements & Improvements	41
6.2	Summary	41
6.3	Objectives achieved	42

Chapter 07	43
7. Bibliography	44

List of Figures

Figure 3.1 Use Case Diagram	13
Figure 3.2 Sequence Diagram (Map)	19
Figure 3.3 Sequence Diagram (District Wise Map)	20
Figure 3.4 Sequence Diagram (Party Wise Map)	20
Figure 3.5 Sequence Diagram (General Election Result)	21
Figure 3.6 Sequence Diagram (MNA Details)	21
Figure 3.7 Domain Model	22
Figure 3.8 Activity Diagram	23
Figure 3.9 ER Diagram	24
Figure 3.10 Enhanced ER Diagram	25
Figure 3.11 Logical ER Diagram	26
Figure 4.1 Home Page	28
Figure 4.2 Home Page	29
Figure 4.3 Map	29
Figure 4.4 Map (Selecting a specific Constituency)	30
Figure 4.5 District Wise Map	30
Figure 4.6 District Wise Map (Selecting a specific District)	31
Figure 4.7 Party Wise Map	31
Figure 4.8 Party Wise Map (Selecting a specific Party)	32
Figure 4.9 MNA Details	32

CHAPTER 01
INTRODUCTION

1. Introduction

The world is now a global village, every process is moving towards automation and digitization. In this modern technological era users prefer everything to be available on a single click online. The existing infrastructure of Election Commission of Pakistan doesn't have the provision of a complete Electoral Constituency Map. The current available maps are in the form of fragments (city wise images) uploaded on the website which provide no real use of the available data on them. The maps need to be integrated onto a single Pakistan map showing the basic division of the constituencies along with other useful attributes/data related to the topic. Our project targets on creating an interactive electoral map, explicitly exhibiting the dissemination of constituencies of the national assembly and integration of pertinent data.

1.1 Problem Statement

The existing infrastructure of Election Commission of Pakistan doesn't have the provision of a complete Electoral Constituency Map. The current available maps are in the form of fragments (city wise images) uploaded on the website which provide no real use of the available data on them.

1.2 Proposed Solution

Our proposed project would integrate all available data regarding the constituencies of Pakistan onto a single map. The user will be able to interact with the maps viewing the exact distributions of constituencies and relatable details regarding them.

1.3 Project Scope

Our project focuses on the following objectives:

- Transforming electoral data onto a single map and actionable information
- Integrate all constituencies of Pakistan over a single map

IEM - Interactive Electoral Map

- Interactive Map, Pop-View Details and zoom
- Show constituency wise data of
 - Voters
 - Representatives
 - Past election results

1.4 Definitions, Acronyms, Abbreviations

Abbreviation	Complete
IEM	INTERACTIVE ELECTORAL MAP: It is the name of our proposed project which will provide a digitized interactive electoral map with integrated constituencies onto a single map providing users with a platform to view their constituency, its geographic location, its results and winning MNA details
MCS CSE Dept	Military College of Signals Computer SoftwareEngineering Department
ECP	Election Commission of Pakistan The government organization responsible for the conduct and record of Elections in Pakistan. Most data related to our project had to be obtained from their office and website. Also responsible for delimitation of constituencies and electoral demarcations

NA	National Assembly The National Assembly of Pakistan is the lower house of senate. The members are elected through democratic elections. It has 272 elected members through elections and 70 seats reserved for minorities and women
SRS	Software Requirement Specification
SDS	Software Design Specification

Table 1.1 Table of Definitions, Acronyms & Abbreviations

1.5 Intended Audience and Reading Suggestions

The Software Requirements Specification (SRS) document is meant for the following stake holders.

- **Project Supervisor:** to assist in project supervision and guiding the team in a better way.
- **Development Team:** to help in development of product and trace-back of functional requirements.
- **Testing Team:** to help the testers to understand the applicable constraints.

IEM - Interactive Electoral Map

- **Users:** ECP Staff and Pakistani citizens.
- **UG Project Evaluation Team:** to assist the evaluation committee in evaluation progress of UG Projects.

CHAPTER 02
SOFTWARE REQUIREMENTS SPECIFICATION

2. Software Requirement Specification

2.1 Methodology

- Compilation of latitude/longitude values for all constituencies
- Integration onto a single web-based map using 'Google map API '
- Customized Markers defining boundaries of each constituency
- Providing a functionality of applying different map overlays
- Adding attributes for data.
- Zoom and Scale control to the map.
- Interactive layers i.e. user can interact with layers using mouse and can handle events.

2.2 Functionalities

2.2.1 Functional requirements:

- Compilation of constituency's latitude/longitude values
- All constituency boundaries to be marked over the map
- Several overlays of map for each constituency showing different data i.e Demography, Population
- Option available to view detailed data i.e name of the candidate, party affiliation, bio data etc

2.2.2 Non-Functional Requirements

2.2.2.1 Performance Requirements

2.2.2.1.1 Response Time

Response time will be approximately 5 to 30 sec when an action is performed based on internet performance.

2.2.2.1.2 Startup Time

Startup time will be less than 5 to 30 sec based on the internet Performance.

2.2.2.2 Graphical User Interface Requirements

- User Interface will be consistent between the modules.

2.2.2.3 Portability

The minimum requirement for the system is listed below in terms of portability

- Web browser
- Internet Connection

2.2.2.4 Availability

The system shall be available depending upon hosting server and availability of the internet.

2.2.2.5 Usability

The system should be easy to use so that user is able to use the system. He / She should have basic knowledge of using the Google map.

- Easy to understand
- System must be able to display data with all desired actions

2.3 Users

- User must know how to use the web browser, internet and google map
- Initial user will be the ECP staff

2.4 Operating Environment

The software and languages used are mentioned below:

- Leafletjs
- MySQL DB
- PHP
- CSS

The Hardware required are:

- Any device which can support a web browser and internet connection

2.5 External Interface Requirements

2.5.1 User Interfaces

- Front end:
 - Leafletjs, CSS
- Back end software:
 - PHP, MySQL DB

2.5.2 Hardware Interfaces

- Web Browser

2.5.3 Software Interfaces

Following software will be used in this project

- Leafletjs
- PHPMYAdmin

2.6 Other Non-Functional Requirements

2.6.1 Performance Requirements

- User must have a device supporting web browser and internet.

2.6.2 Software Quality Attribute

- **Availability:** The data on the different constituencies from different cities should be available for showing into map.
- **Correctness:** Accurate and up-to-date data should be available regarding the constituencies.
- **Maintainability:** The administrator should maintain the latest information on database.
- **Usability:** The system should be easy to use to satisfy the maximum number of user needs.

CHAPTER 03
SYSTEM DESIGN

3. System Design

Framework configuration is how you characterize the components, modules and information for a system to fulfill indicated necessities. System development is the way toward making or changing systems, alongside the procedures, practices and strategies used to create them

3.1 Use Case Model

Use Case Model Includes:

- Use Case Diagram
- Use Case Description Brief

3.1.1 Use Case Diagram

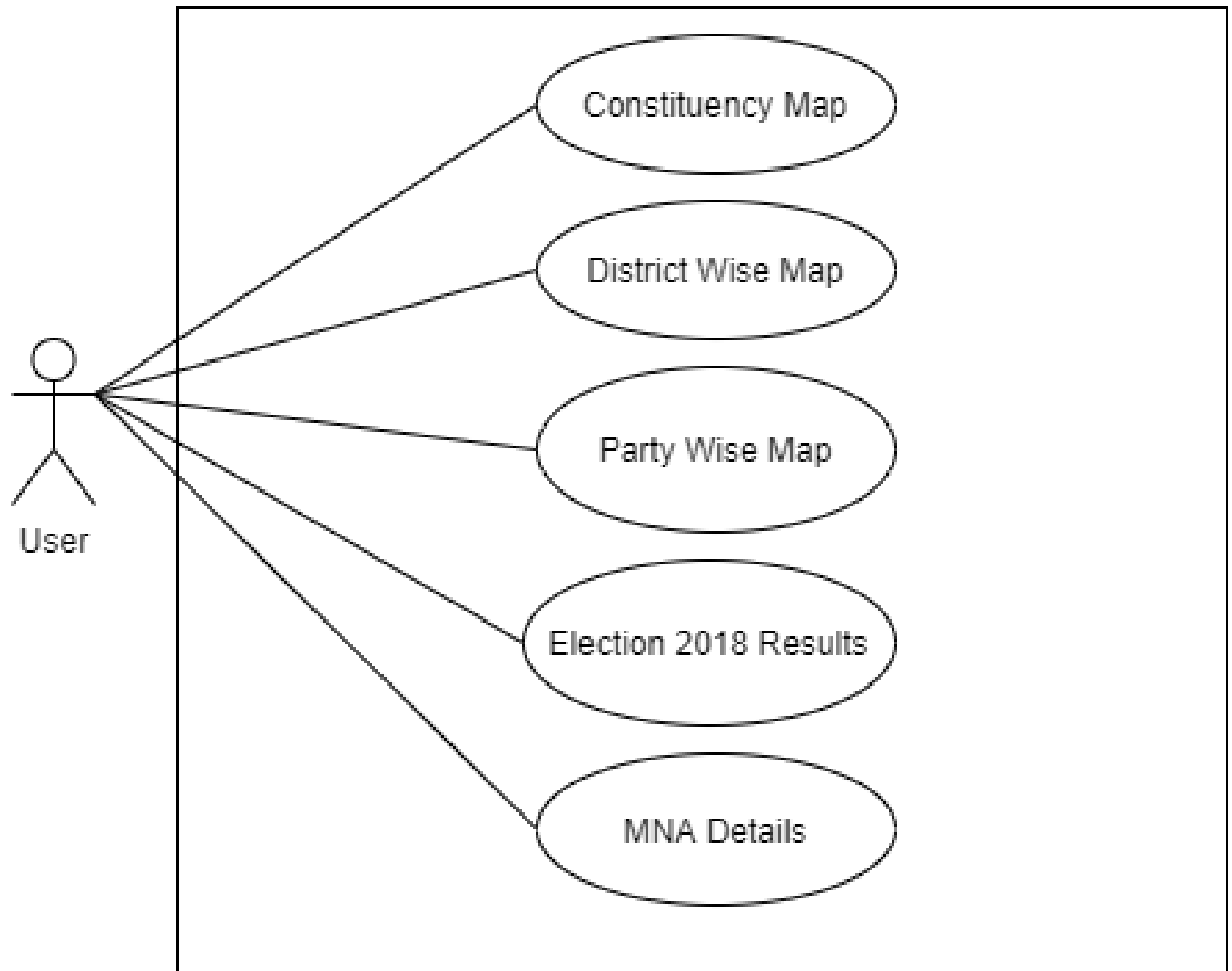


Figure 3.1 Use Case Diagram

3.1.2 Use Case Description

3.1.2.1 Use Case UC 01: Constituency Map

Use Case ID:	1
Use Case Name:	Constituency map
Actors:	Users
Description:	A user can access the complete constituency map of Punjab and Islamabad capital territory.
Preconditions:	User should access the webpage.
Post conditions:	User should be able to access an interactive map window
Normal Flow (Primary Scenario):	<ol style="list-style-type: none"> 1. The system shows a map with constituency boundaries 2. The actor can zoom in/out 3. Select any constituency

Table 3.1 Use Case UC 01: Constituency Map

3.1.2.2 Use Case 02: District Wise Map

Use Case ID:	2
Use Case Name:	District wise map
Actors:	Users
Description:	A user can see district wise distribution of constituencies
Preconditions:	User should be accessed to home page.
Post conditions:	Should give map with district wise distribution
Normal Flow (Primary Scenario):	<ol style="list-style-type: none"> 1. User can select any district 2. The actor can click any constituency in a district 3. Receive data of that constituency

Table 3.2 Use Case UC 02: District Wise Map

3.1.2.3 Use Case UC 03: Party Wise Map

Use Case ID:	3
Use Case Name:	Party wise map
Actors:	Users
Description:	A user can see party wise distribution of constituency
Preconditions:	User should have access to IEM home page
Post conditions:	User can select any party and see the constituencies of that party.
Normal Flow (Primary Scenario):	<ol style="list-style-type: none"> 1. The system shows the color wise party existence in certain constituency 2. Actor can select any constituency and access data

Table 3.3 Use Case UC 03: Party Wise Map

3.1.2.4 Use Case UC 04: Election 2018 Result

Use Case ID:	4
Use Case Name:	Election 2018 result
Actors:	Users
Description:	A user can get access link to past election result in pdf format.
Preconditions:	User should have access to IEM home page
Post conditions:	Link from ECP in pdf format
Normal Flow (Primary Scenario):	The system shows when this link is clicked it will take user to pdf file of past election result of 2018 from ECP website

Table 3.4 Use Case UC 04: General Election Result

3.1.2.5 Use Case UC 05: MNA Details

Use Case ID:	5
Use Case Name:	MNA details
Actors:	Users
Description:	A user can read MNA list and details
Preconditions:	User should have access to IEM home page.
Post conditions:	Link from ECP in pdf format.
Normal Flow (Primary Scenario):	A user can read MNA list and details

Table 3.5 Use Case UC 05: MNA Details

3.2 System Sequence Diagrams

System sequence diagram is a diagram that shows, for a specific situation of use case, the occasions that external characters/actors create, their request, and conceivable between framework occasions. SSD's are visual rundowns of the single-use cases.

3.2.1 Map

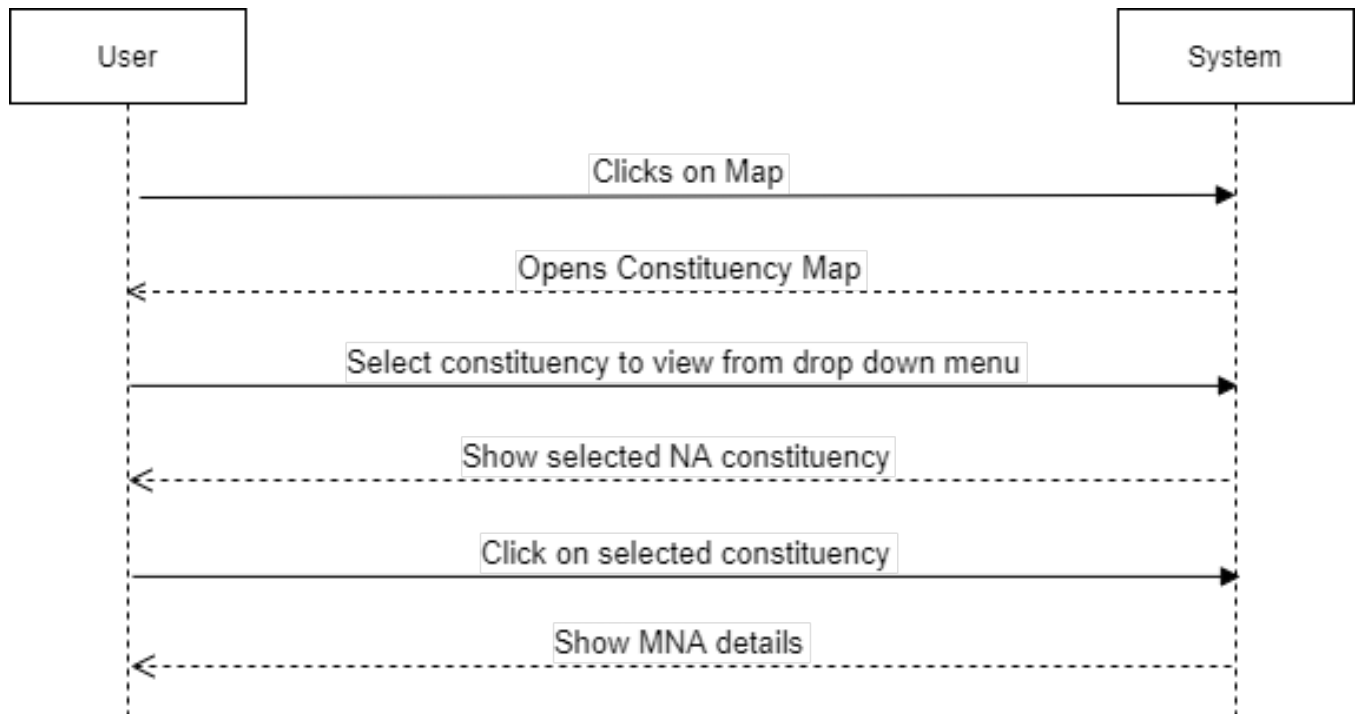


Figure 3.2 Map

3.2.2 District Wise Map

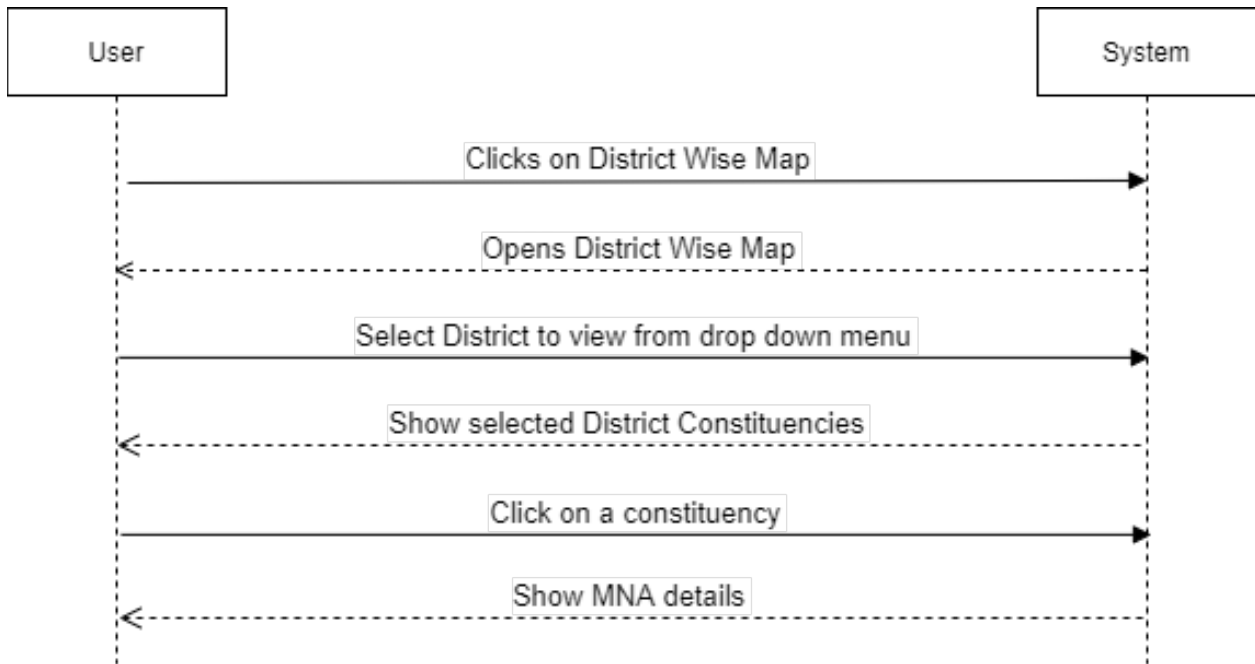


Figure 3.3 District Wise Map

3.2.3 Party Wise Map

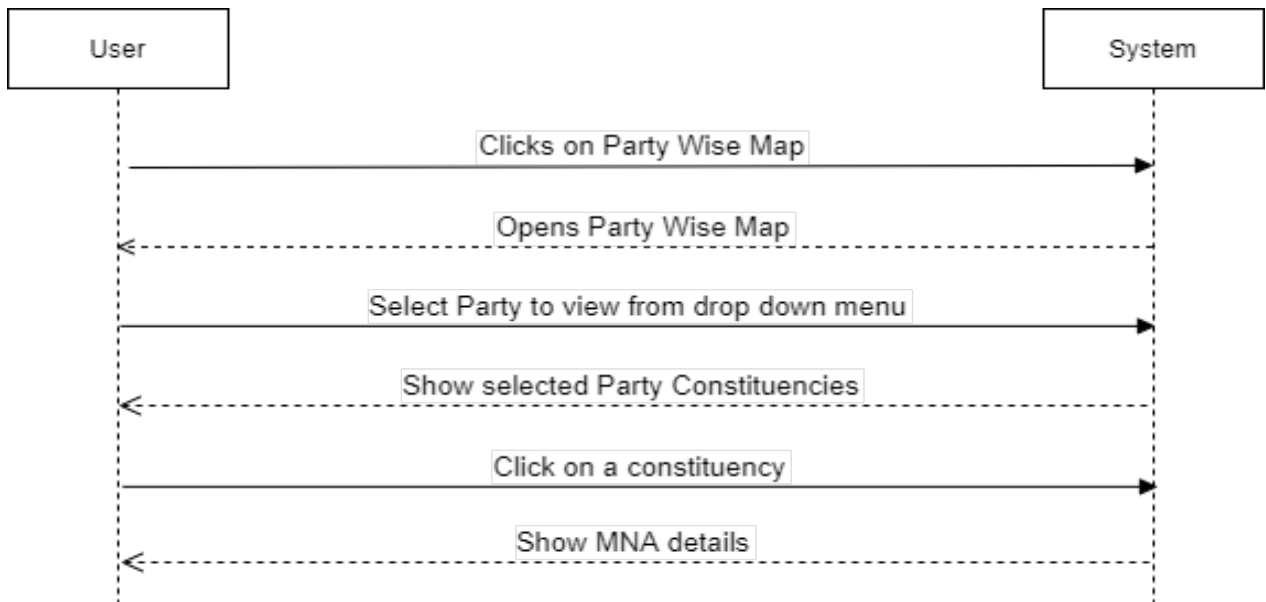


Figure 3.4 Party Wise Map

3.2.4 General Election Results

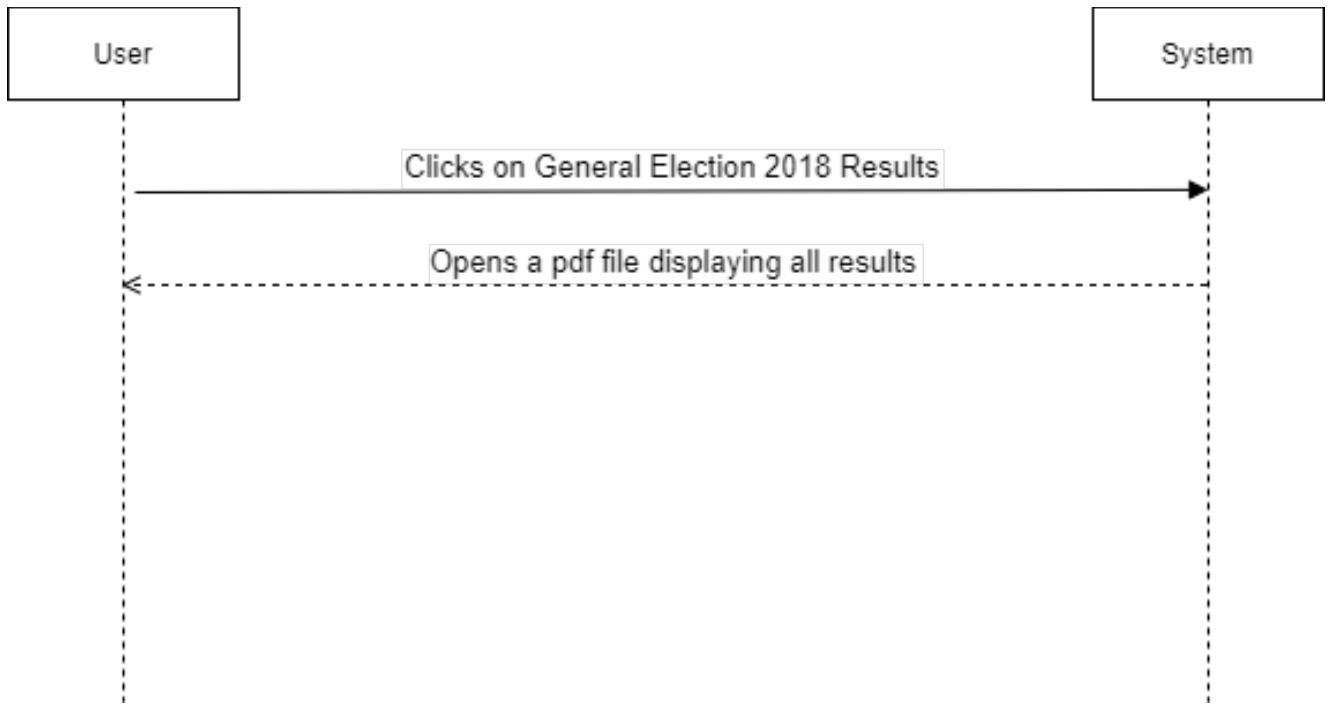


Figure 3.5 General Election Results

3.2.5 MNA Details

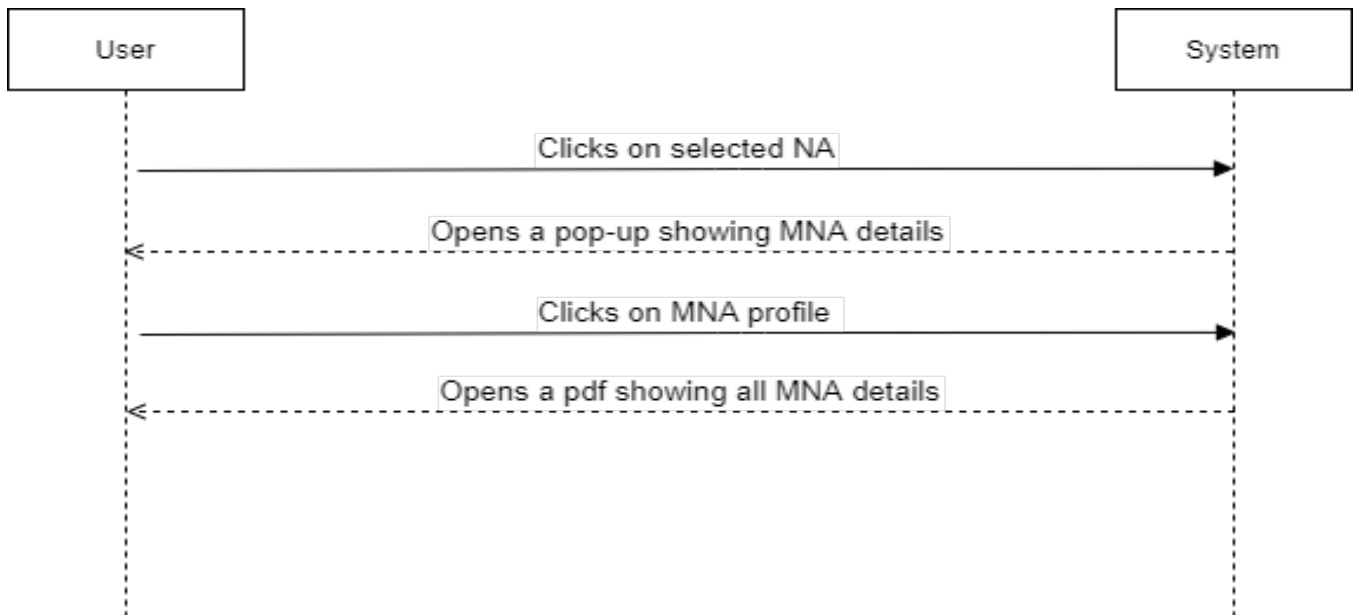


Figure 3.6 MNA Details

3.3 Domain Model

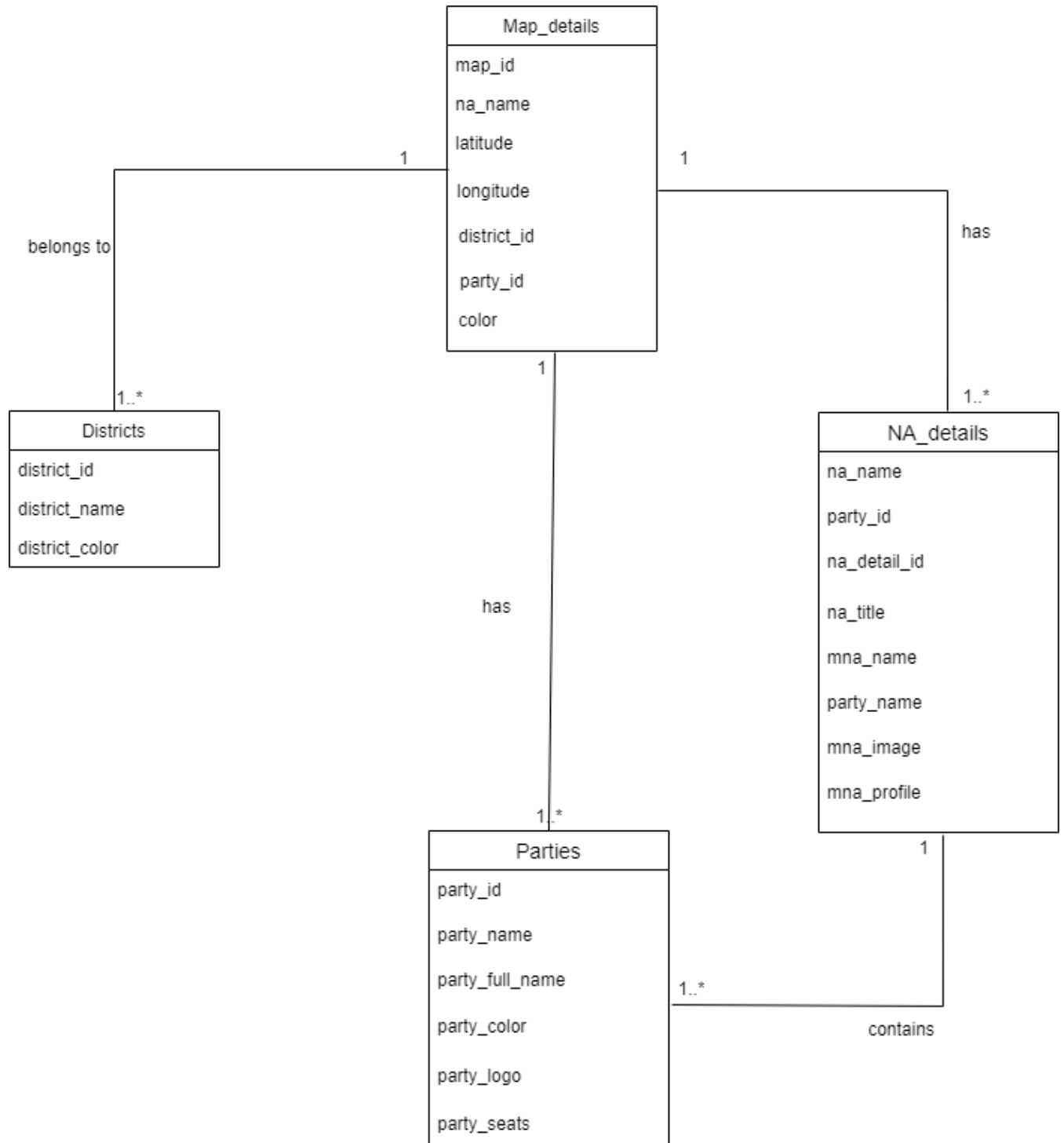


Figure 3.7 Domain Model

3.4 Activity Diagram

IEM - Interactive Electoral Map

It is a UML diagram that shows activities occurring in a sequence and also shows the parallel activities going on. Also shows the data flow.

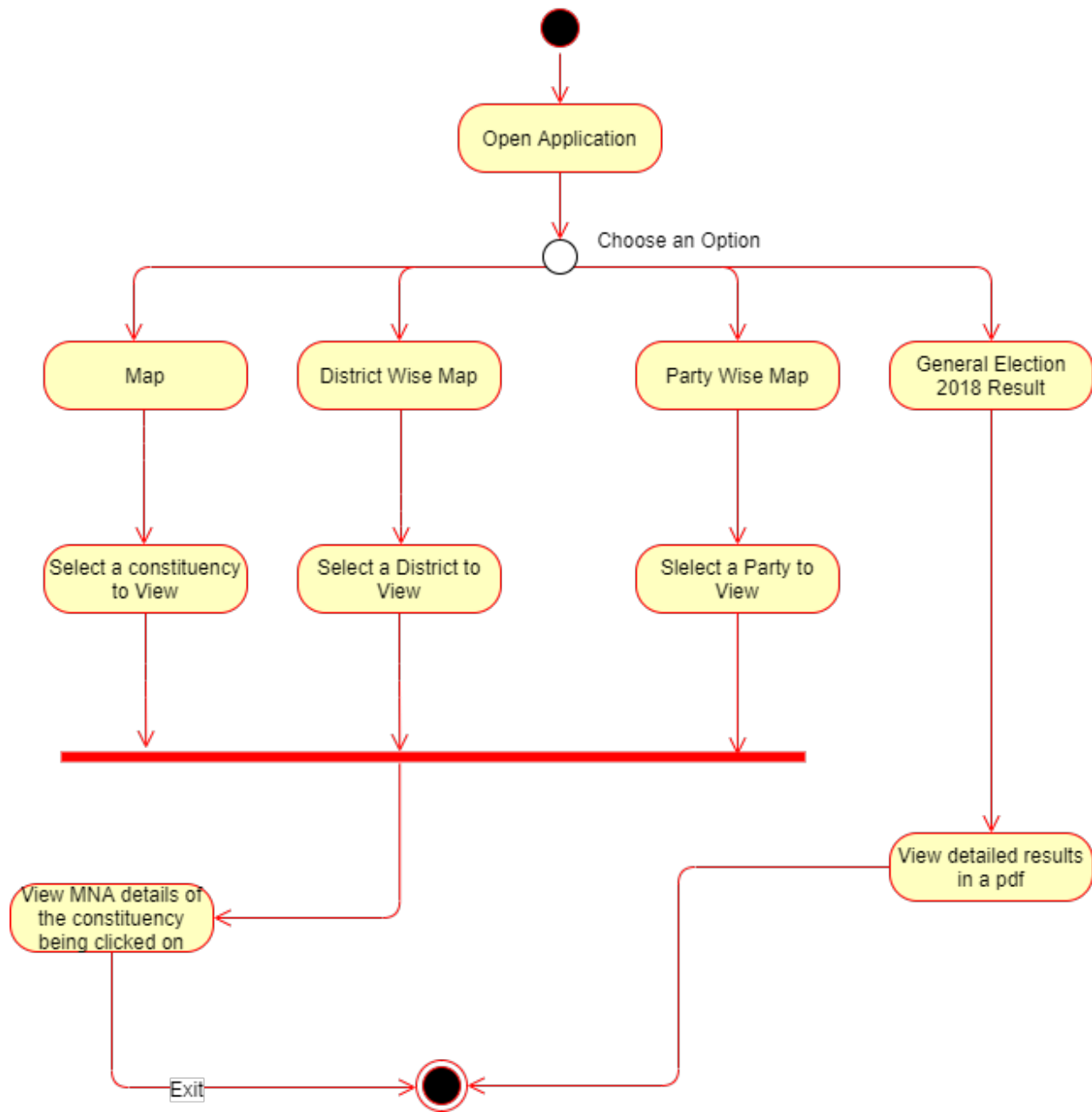


Figure 3.8 Activity Diagram

3.5 ER Diagram

IEM - Interactive Electoral Map

It is a UML diagram that displays the tables in the database as entities and their attributes as circles. It also shows the relationship between the entities.

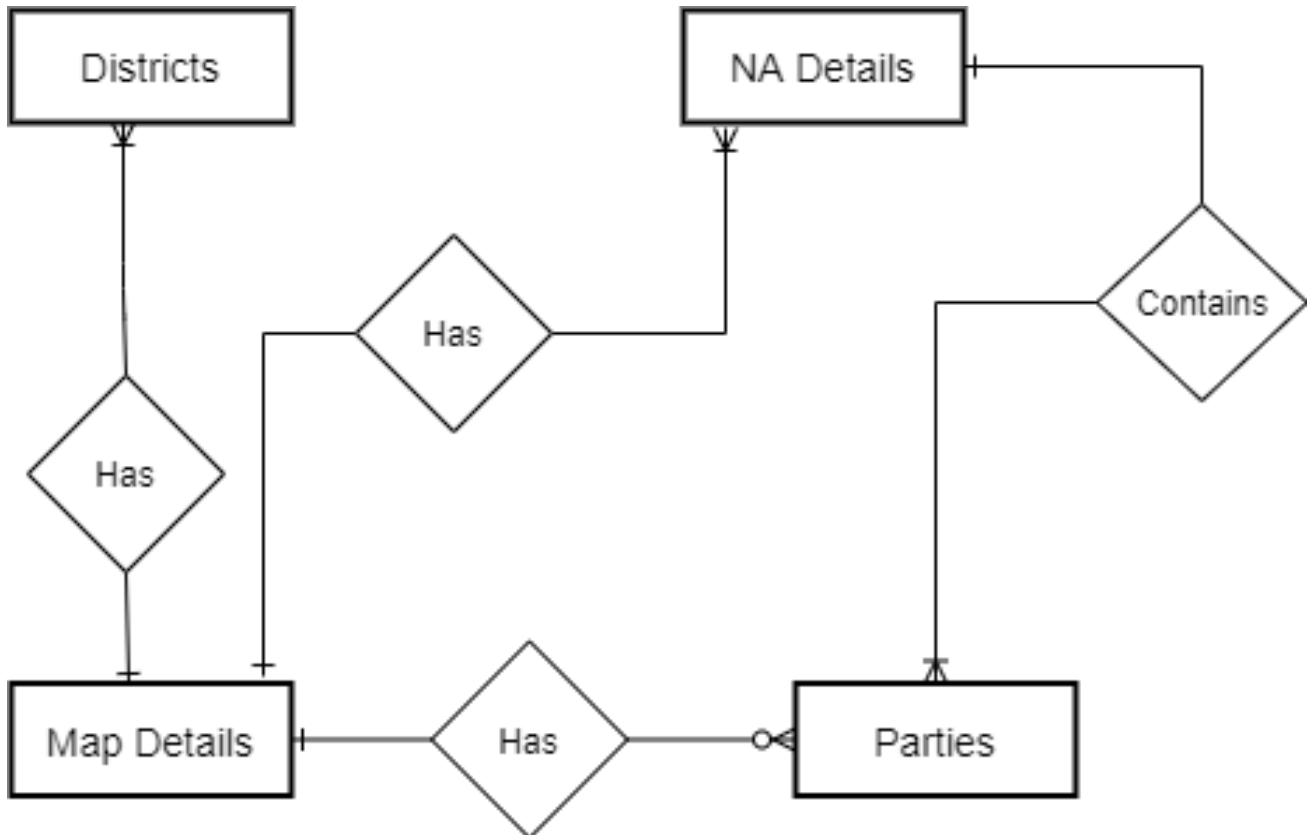


Figure 3.9 ER Diagram

3.6 Enhanced ER Diagram

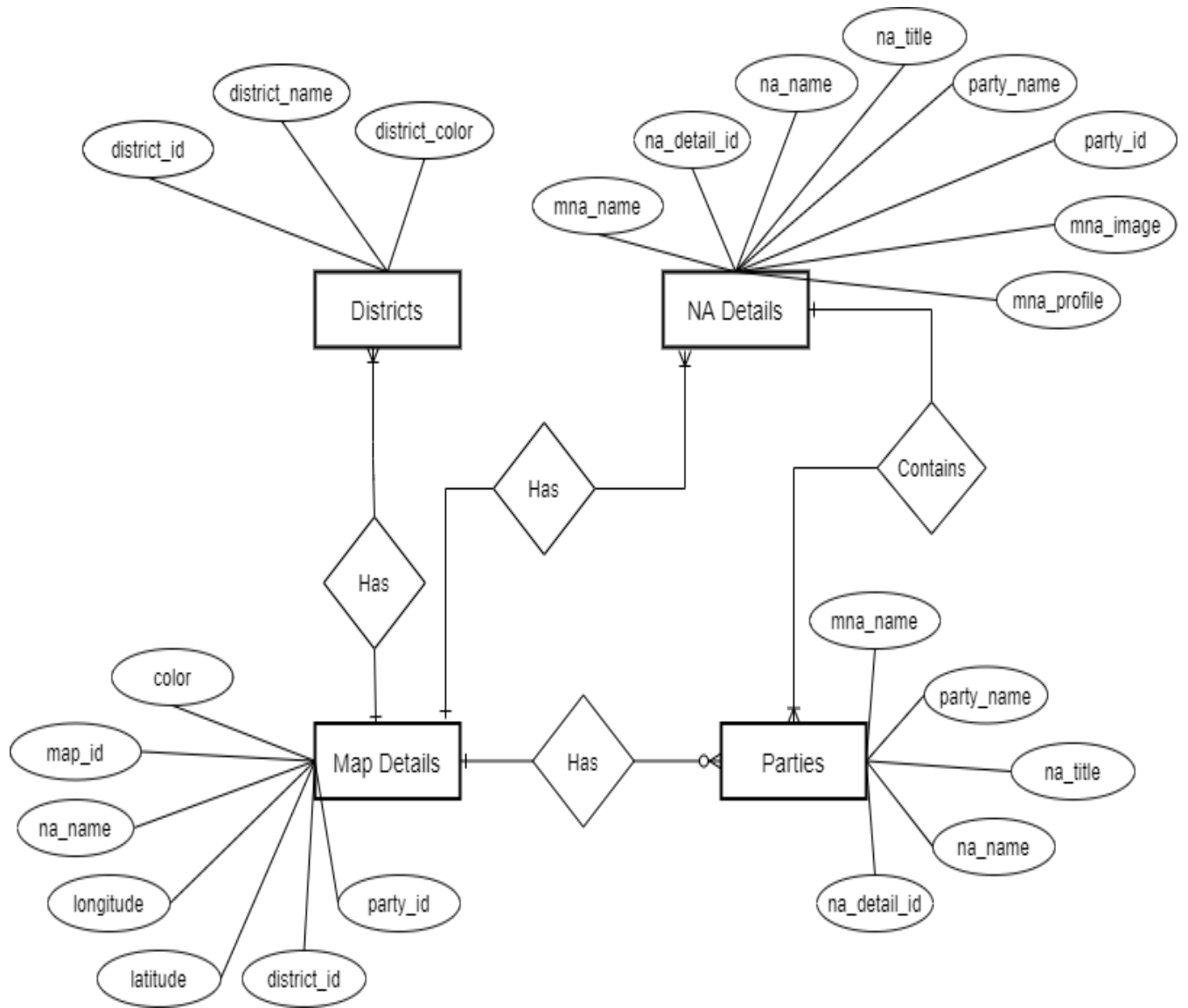


Figure 3.10 Enhanced ER Diagram

3.7 Logical ER Diagram

IEM - Interactive Electoral Map

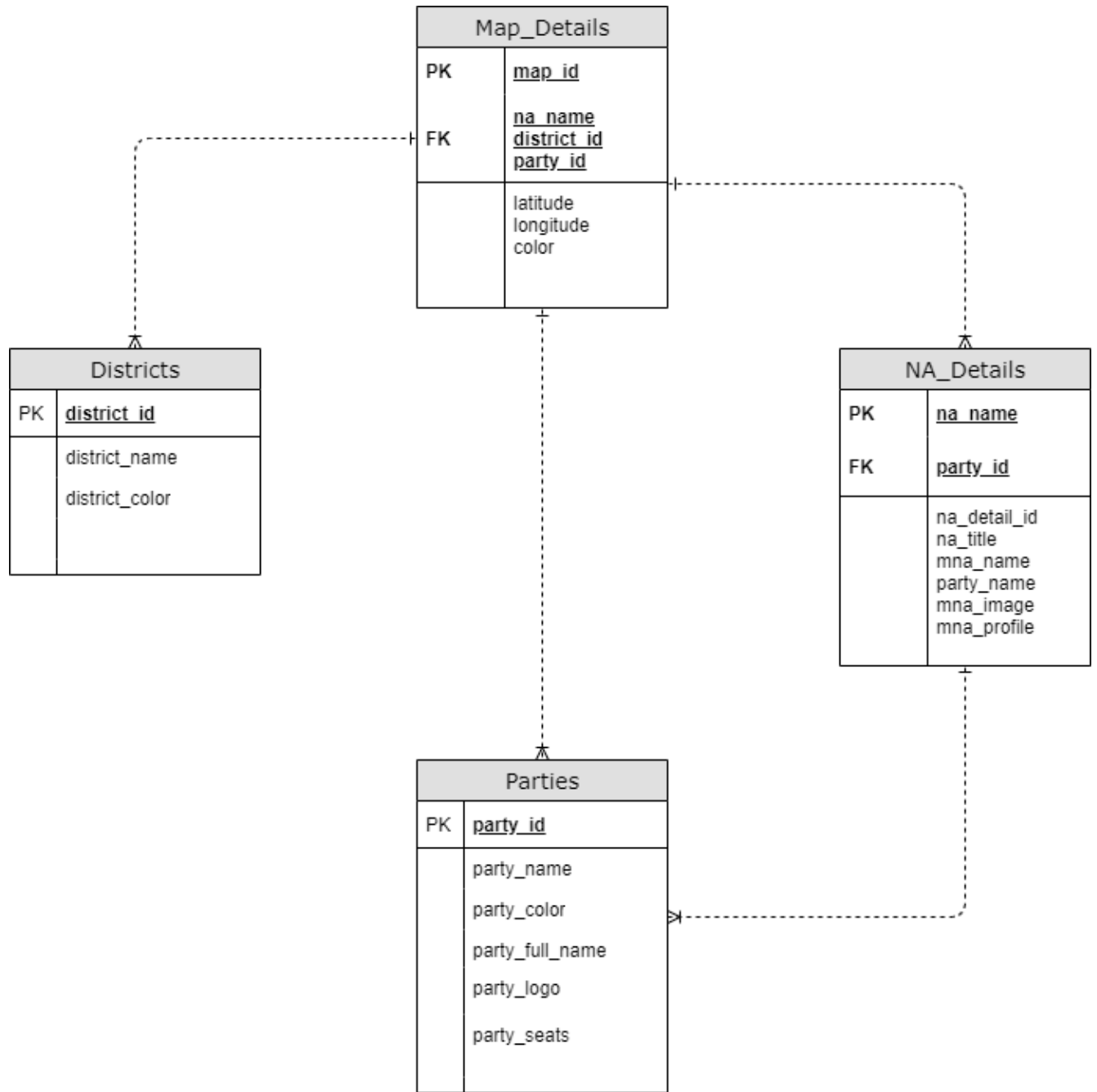


Figure 3.11 Logical ER Diagram

CHAPTER 04

IMPLEMENTATION

4. Implementation

We have implemented Interactive Electoral Map through the best available

IEM - Interactive Electoral Map

software tools and techniques. The tools and techniques used were based on the best performance achieved. Leaflet.js was used for the front end, PHP for the server back end and MySQL DB as the database.

4.1 Project Screenshots

4.1.1 Home Page



Figure 4.1 Home Page

IEM - Interactive Electoral Map

Parties Wise Data

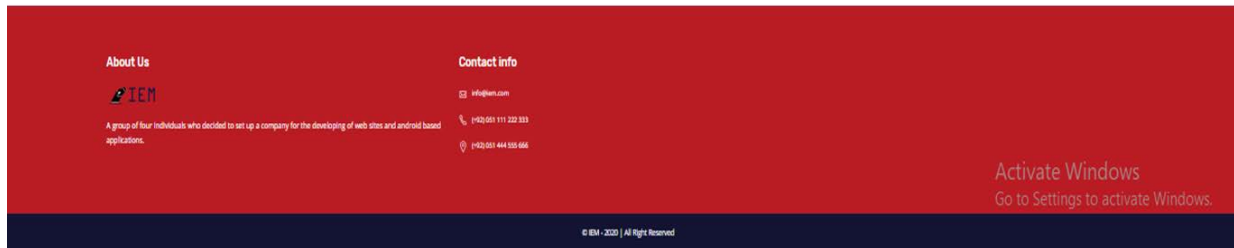


Figure 4.2 Home Page

4.1.2 Map

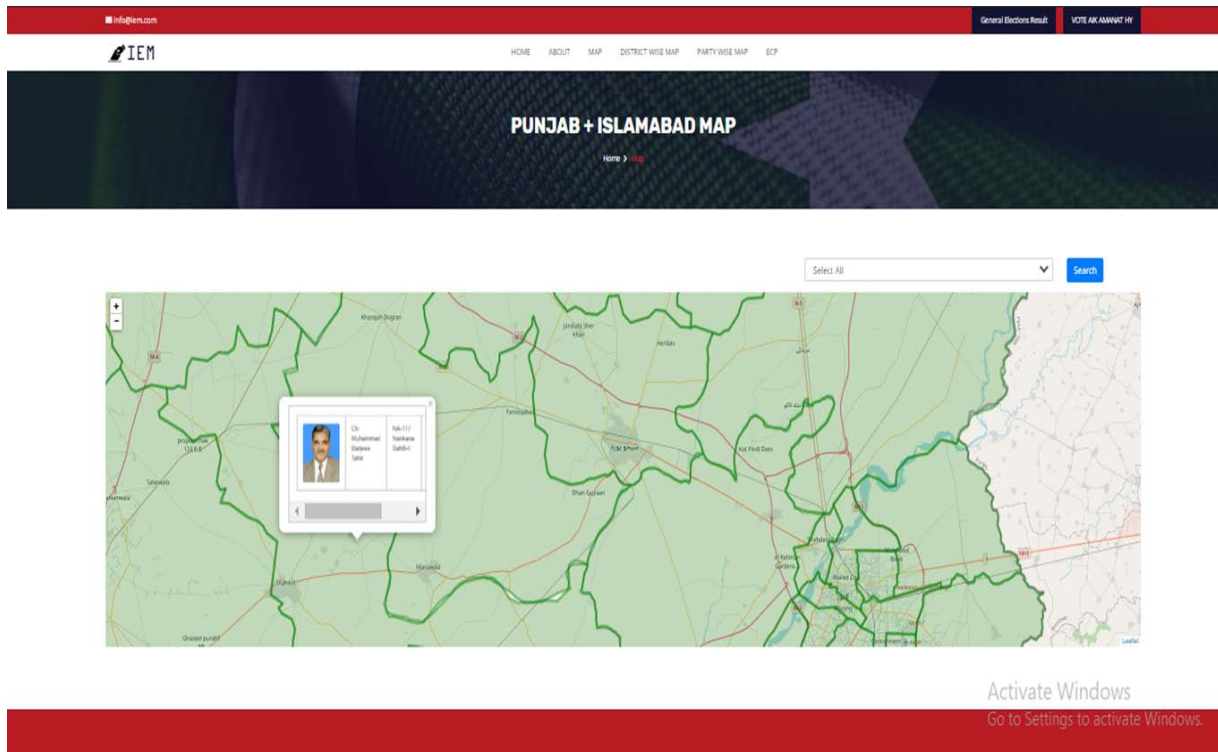


Figure 4.3 Map

4.1.5 District Wise Map (Selecting a specific District)

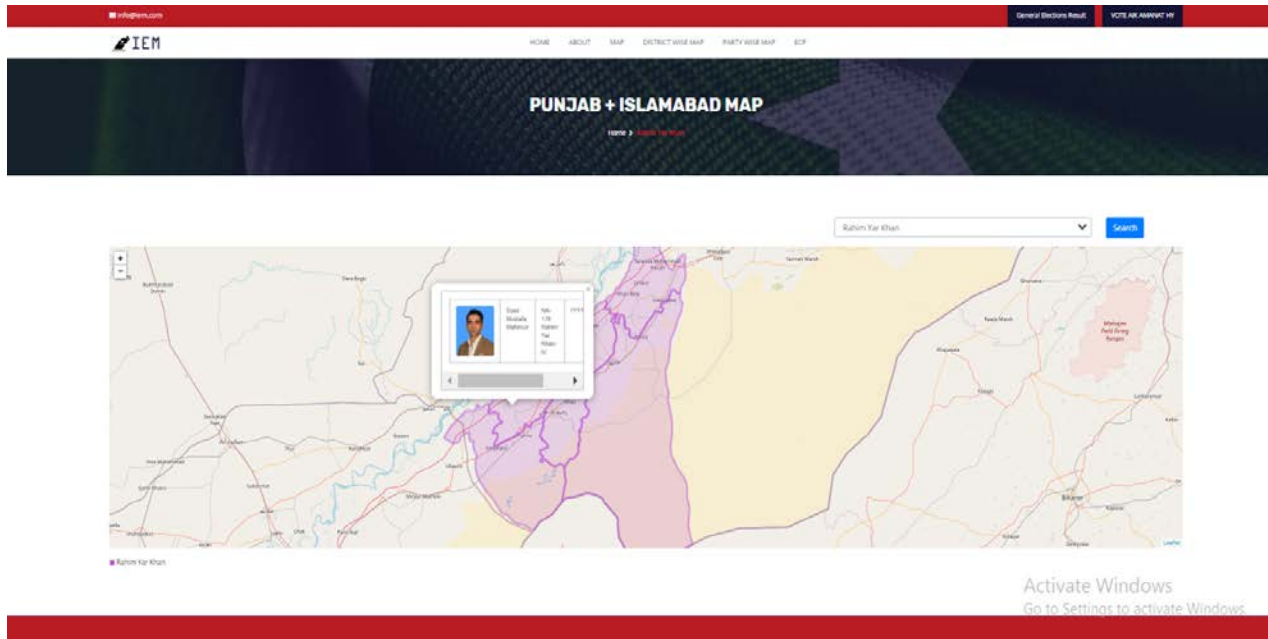


Figure 4.6 District Wise Map (Selecting a specific District)

4.1.6 Party Wise Map

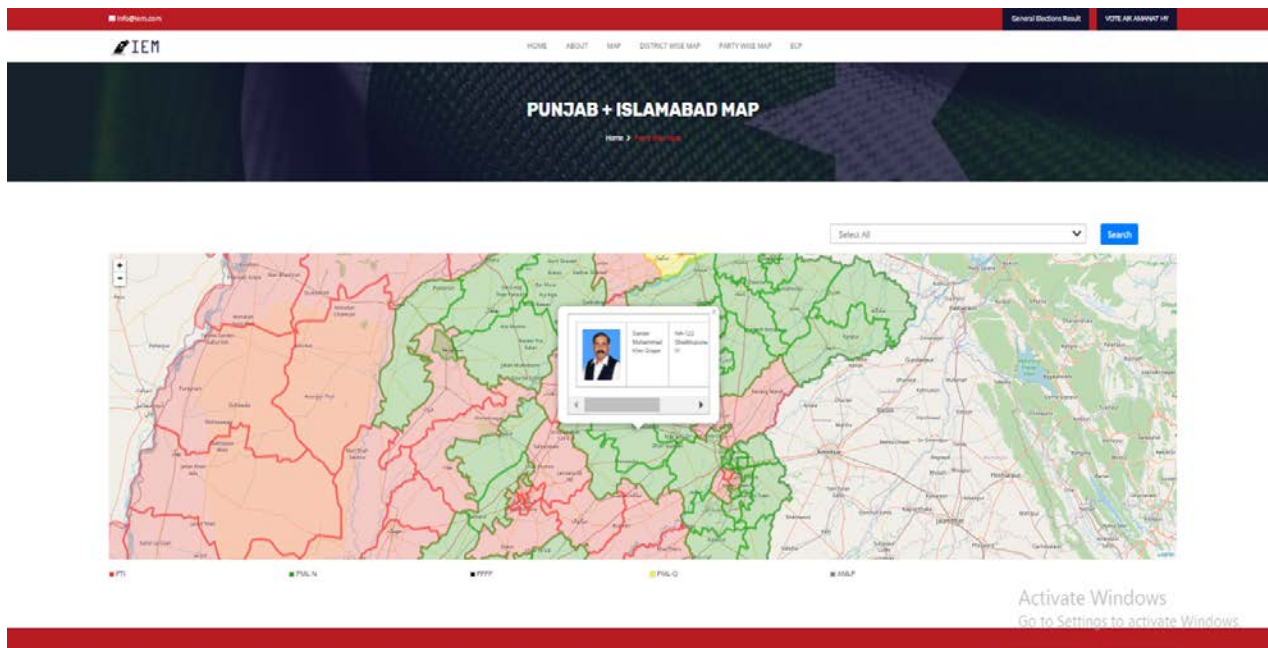


Figure 4.7 Party Wise Map

4.1.7 Party Wise Map (Selecting a specific Party)

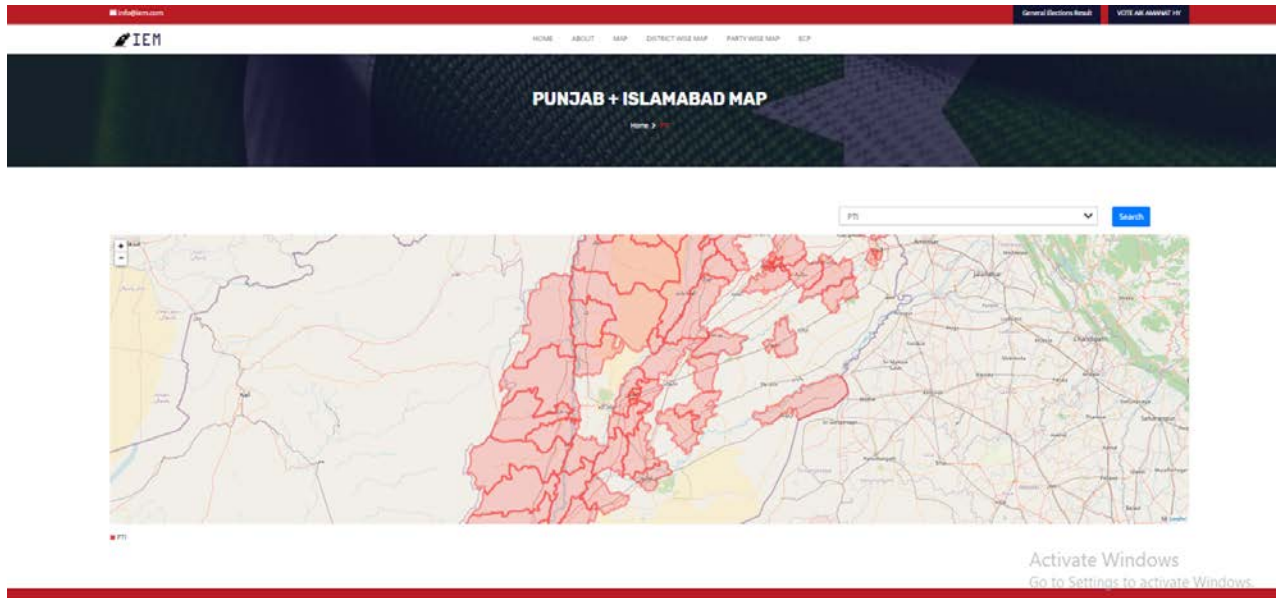


Figure 4.8 Party Wise Map (Selecting a specific Party)

4.1.8 MNA Profile Details

PERSONAL PROFILE

Name	Mr. Rahat Aman Ullah Bhatti
Father's Name	Choudary Sakindar Khan Bhatti
Permanent Address	Hitchar Post Office Khass Tehsil Muridke District Sheikhupura.
Local Address	E-412, Parliament Lodges, Islamabad
Contact Number	0323-4760306, 0309-6339920
Province	Punjab
Constituency	NA-119(Sheikhupura-I)
Party	PTI
Oath Taking Date	13-08-2018



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Figure 4.9 MNA Details

CHAPTER 05

TESTING

5. Testing

Test cases are a set of conditions through which a test case engineer will decide as to whether a system operates successfully.

5.1 Test Case TC 01: Map

Test Case ID	TC -01
Functional Area/Module	Map
Purpose	To Enable user to view the constituency Map
Action to Perform	<ol style="list-style-type: none"> 1. User clicks the Map button. 2. The Map page opens up 3. User selects specific NA constituency on the Map or the drop down menu 4. The selected NA opens up on the map. 5. The User clicks on the selected NA to view MNA details 6. Finish
Prerequisites	User is on the Website.
Test Case Engineer	Masab Mehboob Abdullah Kamran Taimoor Riaz Muhammad Zeeshan
Environment	Windows 10, Google Chrome
Expected Result(s)	User viewed desired constituency successfully
Comments: Test passed successfully	

Table 5.1 Test Case TC 01: Map

5.2 Test Case TC 02: District Wise Map

Test Case ID	TC -02
Functional Area/Module	District Wise Map
Purpose	To Enable user to view the District Wise Map
Action to Perform	<ol style="list-style-type: none"> 1. User clicks the District Wise Map button. 2. The District Wise Map page opens up 3. User selects specific District on the Map or the drop down menu 4. The selected district opens up on the map. 5. The User clicks on the selected NA to view MNA details 6. Finish
Prerequisites	User is on the Website.
Test Case Engineer	<p>Masab Mehboob</p> <p>Abdullah Kamran</p> <p>Taimoor Riaz</p> <p>Muhammad Zeeshan</p>
Environment	Windows 10, Google Chrome
Expected Result(s)	User viewed desired district constituency successfully
Comments: Test passed successfully	

Table 5.2 Test Case TC 02: District Wise Map

5.3 Test Case TC 03: Party Wise Map

Test Case ID	TC -03
Functional Area/Module	Party Wise Map
Purpose	To Enable user to view the Party Wise Map
Action to Perform	<ol style="list-style-type: none"> 1. User clicks the Party Wise Map button. 2. The Party Wise Map page opens up 3. User selects specific Party on the Map or the drop down menu 4. The selected party opens up on the map. 5. The User clicks on the selected NA to view MNA details 6. Finish
Prerequisites	User is on the Website.
Test Case Engineer	<p>Masab Mehboob</p> <p>Abdullah Kamran</p> <p>Taimoor Riaz</p> <p>Muhammad Zeeshan</p>
Environment	Windows 10, Google Chrome
Expected Result(s)	User viewed desired party constituencies successfully
Comments: Test passed successfully	

Table 5.3 Test Case TC 03: Party Wise Map

5.4 Test Case TC 04: General Election Results

Test Case ID	TC -04
Functional Area/Module	General Election Result
Purpose	To Enable user to view the General Election Results
Action to Perform	<ol style="list-style-type: none"> 1. User clicks the General Election Result button. 2. TheGeneral Election Result page opens up in a new tab 3. The General Election Results file is also downloaded 4. Finish
Prerequisites	User is on the Website.
Test Case Engineer	<p>Masab Mehboob</p> <p>Abdullah Kamran</p> <p>Taimoor Riaz</p> <p>Muhammad Zeeshan</p>
Environment	Windows 10, Google Chrome
Expected Result(s)	User viewed desired General Election Result successfully
Comments: Test passed successfully	

Table 5.4 Test Case TC 04: General Election Results

5.5 MNA Details

Test Case ID	TC -05
Functional Area/Module	MNA profile details
Purpose	To Enable user to view the MNA profile details
Action to Perform	<ol style="list-style-type: none"> 1. User clicks on any specific NA constituency on the Map 2. A pop-up appears and shows the MNA basic details 3. User clicks on the profile link 4. A separate link opens showing details of MNA 5. Finish
Prerequisites	User is on the Website.
Test Case Engineer	<p>Masab Mehboob</p> <p>Abdullah Kamran</p> <p>Taimoor Riaz</p> <p>Muhammad Zeeshan</p>
Environment	Windows 10, Google Chrome
Expected Result(s)	User viewed desired General Election Result successfully
Comments: Test passed successfully	

Table 5.5 Test Case TC 05: MNA Details

5.6 Summary

The chapter has defined the major test case scenarios that can affect the application if they have errors. The test case scenarios define all the possible inputs and outputs to and from the application. These test case scenarios can be used to define actual test cases which then can be used to check the system for any errors. Apart from the functional testing of the system the testing of actual algorithm and their working will require a sizeable dataset. The dataset can then be used to actually test the system's functionality and accuracy of the recommendations produced by the application. But due to small time period of development and non-availability of dataset the actual testing will be performed on smaller scale with a limited dataset.

CHAPTER 06
CONCLUSION

6. Conclusion

This chapter concludes our project documentation. Here we are presenting the overall summary of the project right from the first day of its beginning till its day of successful completion.

6.1 Achievements and Improvements

We as a group feel we have improved and achieved a lot throughout the process of the Final Year Project. Improved level of understanding, research and problem solving are some of the mentionable achievements. As a group we learned a lot about the General Election conduct in Pakistan, delimitation of constituencies, marking of boundaries of constituencies and examining maps.

6.2 Summary

Our project can be summarized in the following points

- Shows constituency wise data of past election results
- The project has digitized the constituency map of Pakistan with added feature of interactivity for the users
- The users are able to interact with the maps viewing the exact distributions of constituencies and relevant details
- It is an Independent and integrated digital constituencies map

6.3 Objectives Achieved

Our project focused on creating an interactive electoral map, explicitly exhibiting the dissemination of constituencies of the national assembly and integration of pertinent data. Following objectives were achieved :

- Digitizing the constituency map

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- Interactive mapping for the users
- Transforming electoral data onto a single map and actionable information
- Integrating constituencies onto a single map
- Smart mapping and annotation use

CHAPTER 07
BIBLIOGRAPHY

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