ElectViz Election Data Visualization for Media

INFOSYS SPRINGBOARD INTERNSHIP 6.0

Milestones Summary Report

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Milestone – 1

1. Project Objective

The ElectViz project aims to analyze and visually represent complex Indian state election data using Microsoft Power BI. The primary goal is to convert large volumes of raw election data into an interactive, clear, and user-friendly.

This tool is designed specifically for media organizations, political analysts, and the public to explore voting patterns, party performance, and historical trends without needing to sift through complex spreadsheets.

The main goals of this project are:

1. To consolidate and analyze key election metrics, including total votes, party participation, seats won, and voter turnout.

2. To identify historical voting trends by visualizing data across different election years.

3. To provide a comparative analysis of political party performance at both the state and national levels.

4. To create a detailed breakdown of seat distribution by state and constituency type.

5. To utilize Power BI's interactive features (slicers, filters, and drill-downs) to empower users to find specific insights dynamically.

6. To provide a data-driven tool for media to support accurate reporting and insightful political commentary.

2. *Project Description*

The ElectViz project was developed as part of the **Infosys Springboard Virtual Internship 6.0**,with the objective of understanding how data visualization can enhance electoral and political reporting. The project utilizes an Indian Election dataset sourced from Kaggle to design an interactive Power BI dashboard that presents national and regional election outcomes, party-wise performance comparisons, alliance analysis, and voter behavior patterns.

3. *Overview and Purpose*

In today's fast-moving media environment, particularly during election periods, there is a strong demand for quick, accurate, and visually compelling data insights. Indian elections are among the largest and most complex in the world, involving thousands of political parties and millions of voters across multiple decades.

The ElectViz project addresses this challenge by offering a single, integrated Power BI dashboard that provides a comprehensive overview of Indian state election history. The dashboard can be filtered by year, state, party, and constituency, allowing users to instantly access key statistics, identify trends, and compare party performances. This enables media professionals to create reliable, data-backed election reports and narratives.

4. *Dataset Description*

The dataset used in this project is a detailed and granular collection of Indian state election results. It includes the following key attributes:

- **st_name** – Name of the state where the election was conducted
- **year** – Election year
- **ac_no** – Unique assembly constituency number
- **ac_type** – Type of constituency (e.g., General)
- **cand_name** – Candidate name
- **cand_sex** – Gender of the candidate
- **partyname** – Full name of the political party
- **partyabbre** – Abbreviation of the party name
- **totvotpoll** – Total votes polled by the candidate
- **electors** – Number of eligible voters in the constituency
- **result** – Election outcome (Won/Lost)
- **Seats Won** – Indicator showing whether the seat was won

5. Tools and Technologies Used

- **Microsoft Power BI Desktop** – Used for data modeling, analysis, and dashboard creation
- **Power Query Editor** – Used for data cleaning, transformation, and standardization
- **DAX (Data Analysis Expressions)** – Used to create KPIs and calculated measures such as total votes, seats won, and winning margins
- **Microsoft Excel** – Used for initial data preparation and formatting
- **Canva & PowerPoint** – Used for report presentation and visual enhancement.

6. Requirement Analysis

The ElectViz project focuses on cleaning, analyzing, and visualizing Indian State Election data in a format suitable for media reporting.

a) Dataset Understanding

The raw dataset included information such as state name, election year, constituency details, candidate information, party name, votes polled, elector count, and election results. These fields were reviewed to ensure accuracy and completeness.

b) Data Cleaning Requirements

To prepare the dataset for analysis in Google Colab, the following steps were performed:

- Removal of spaces and special characters from column names
- Conversion of vote-related fields into numeric data types
- Handling missing values in candidate and party names
- Removal of duplicate records
- Saving the cleaned dataset for further analysis

c) Analysis Requirements

- Total votes calculation
- Total number of parties
- Total seats won
- Basic visualizations such as bar charts and histograms

7. *Challenges we Faced*

Step 1 – Loading the Dataset First, we began by importing the required libraries and loading the election dataset into a pandas DataFrame. This step brings the raw CSV file into our working environment so we can inspect, clean, and analyze it. We also checked the first few rows to confirm that the data was loaded correctly.

Step 2 – Inspecting the Dataset Structure After loading the dataset, our next task was to understand its structure. We used .info(), .shape, and .columns to see how many rows and columns are available and what type of data each column contains. This gave us an overview of the dataset's schema and helped us identify initial issues like inconsistent data types."

Step 3 – Checking for Missing Values Once we understood the structure, we checked for missing values using .isnull().sum(). This helped us identify incomplete information—such as missing party names or vote counts—that could affect our analysis. Detecting missing values early ensures that the dataset is clean and reliable.

Step 4 – Cleaning Column Names & Text Fields 7 Next, we cleaned and standardized the column names by converting them into snakecase and removing unnecessary spaces. We also filled missing text fields with placeholders like 'Unknown'. These steps make the dataset easier to work with and prevent errors during processing.

Step 5 – Converting Numeric Columns & Fixing Errors At this stage, we focused on numeric fields such as electors and votes. We converted them to numeric types using pd.to_numeric() and fixed obvious errors like negative values or non-numeric characters. This ensures that calculations like vote totals and turnout percentages are accurate.

Step 6– Aggregating Winners & Party Totals We then performed group-by operations. We identified the winning candidate for each constituency by selecting the one with the highest votes. For each party, we aggregated total votes and total seats won. These summaries form the core of our election analysis.

Step 7 – Visualization To make the analysis easier to interpret, we created visualizations such as bar charts showing the top parties based on total votes. Visuals help reveal trends and patterns that may not be immediately visible in raw numbers.

Step 8 – Exporting Cleaned Data & Documentation Finally, we exported the cleaned dataset and prepared a summary report explaining the dataset schema, cleaning steps followed, metrics created, and initial insights. This makes our analysis reproducible and easy to share with others.

5. *Conclusion*

This project demonstrated the complete workflow of transforming raw election data into meaningful insights using Python, Google Colab, and Power BI. Each stage— from data loading and cleaning to analysis and visualization—enhanced data accuracy and reliability.

The dashboards effectively present voting trends, party performance, and winning margins, enabling easy interpretation of election outcomes. Overall, this project strengthened practical skills in data cleaning, preprocessing, visualization, and analytical storytelling, while also improving confidence in handling real-world datasets independently.

MILE STONE -2

DASHBOARD DEVELOPMENT & VISUALIZATION

Data modelling:

- The data modelling stage focuses on converting the cleaned dataset into a structured model that supports efficient analysis and visualization.
- After understanding the dataset fields and their relationships, a logical data model was created to ensure smooth calculation, filtering, and reporting inside Power BI.

The Data model follows where: Fact Table:

- Contains key performance metrics such as totals, counts, quantities, or financial values.
- Each row represents a single event/record from the dataset.

Dimension Tables:

Include descriptive attributes such as

- Category
- Region / Location
- Date field
- Product / Service-related attributes
- Any additional classification fields

Relationship Logic:

Establishing one-to-many relationships between the dimension tables and the fact table ensures that all slicers, including Year and State, propagate filters correctly throughout the entire report .

Data Visualization:

Four KPI cards were created the report to provide a quick summary of the election. These cards display Total Votes Polled, Total Candidates, Total Votes Secured, and Average Winning Margin. When the user changes a filter, the KPIs update instantly to reflect the selected view of the election data.

INDIAN GENERAL ELECTION OVERVIEW

34M	36	17M	135.63K
Total_Votes_Polled	Total Candidates	Total Votes Secured	Avg Winning Margin

DAX FORMULAS:

Total_Votes_Polled =	SUM('IndianGE2024_Cleaned_Constituency_Results'[Total_Votes_Polled])
Total Candidates =	DISTINCTCOUNT('IndianGE2024_Cleaned_Constituency_Results'[Candidate Name])
Total Votes Secured =	SUM('IndianGE2024_Cleaned_Constituency_Results'[Votes_Secured])
Avg Winning Margin =	AVERAGE('IndianGE2024_Cleaned_Constituency_Results'[Winning_Margin])

Data Visualization:

Fig 1: Bar chart, Pie chart

The **Seats Won by Party** chart shows which parties secured the most seats, with INC and BJP leading. The **Total Votes by Party** visual highlights overall voter support, helping compare vote share among parties. The **Winning Margin by Constituency** chart reveals where contests were won by large or small margins, identifying both strongholds and closely contested areas. The **Candidates by Gender** pie chart shows the gender distribution of candidates, indicating that elections are predominantly male-represented. Together, these visuals give a concise yet meaningful understanding of electoral patterns and participation.

DAX FORMULAS:

Seats Won by Party =	CALCULATE(COUNTROWS('IndianGE2024_Cleaned_Constituency_Results'), 'IndianGE2024_Cleaned_Constituency_Results'[Is_Winner] = TRUE)
Total Votes by Party =	SUM('IndianGE2024_Cleaned_Constituency_Results'[Votes_Secured])
Winning Margin Value =	SUM('IndianGE2024_Cleaned_Constituency_Results'[Winning_Margin])
Candidates by Gender =	DISTINCTCOUNT('IndianGE2024_Cleaned_Constituency_Results'[Candidate Name])

Winning Analysis Dashboard

1. Filters (State Name & Winner Name)

Two slicers allow users to refine the analysis based on:
- State Name – view winning details for any specific state.
- Winner Name – analyze the performance of an individual winning candidate.

2. Winner Details Table

The central table displays essential information for each winner, including:

- **Winner Name**
- **Winner Party**
- **Winner Votes Value**
- **Winning Margin Value**
- **Constituency**

This table helps users compare winners quickly and understand variations in performance across constituencies. The total row at the bottom summarizes total votes and total winning margin for all displayed winners.
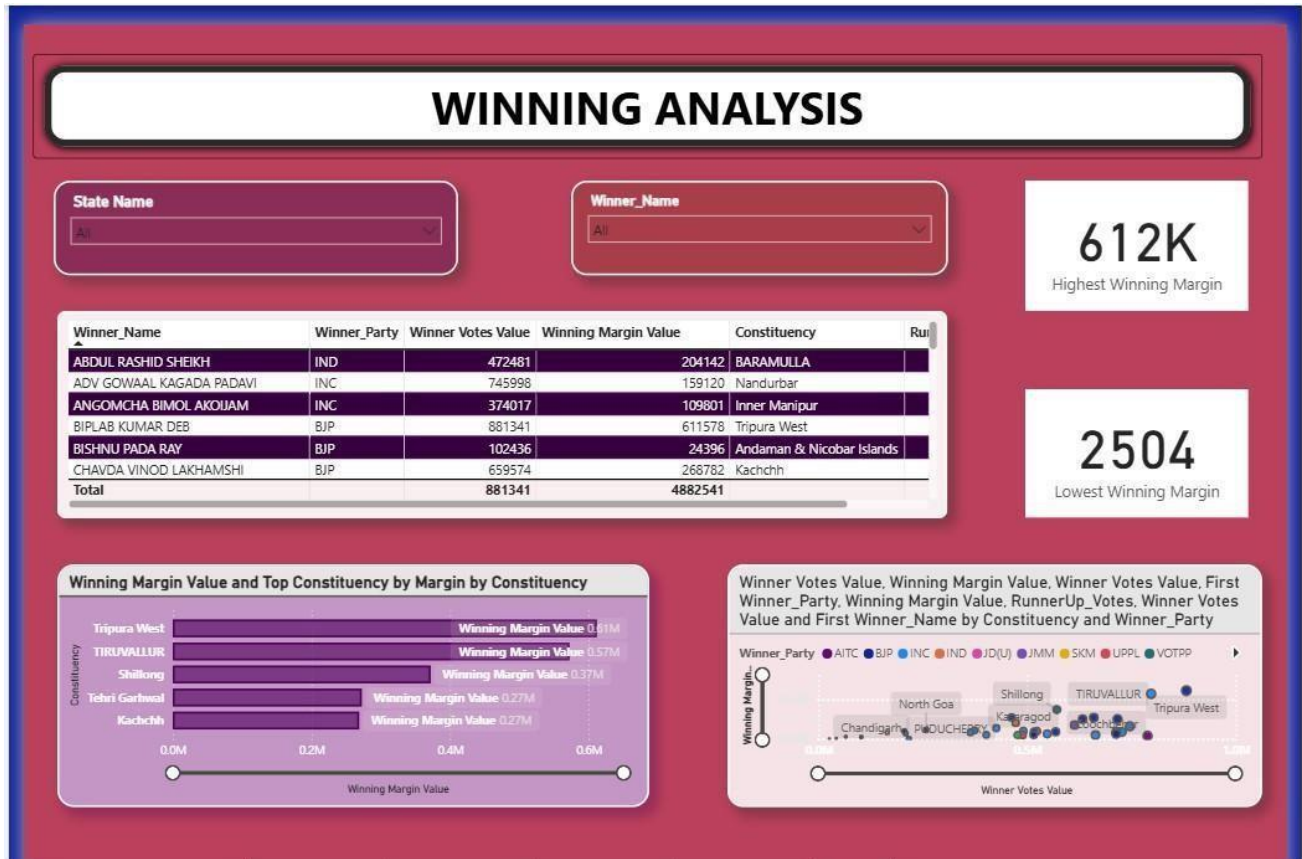
3. DATA VISUALISATION:

Fig: 2

3. KPI Card

Two KPI indicators are included for a quick overview:

- **Highest Winning Margin (612K)**
  Shows the constituency where the candidate won by the largest vote difference, indicating a strong and decisive victory.
- **Lowest Winning Margin (2504)**
  Highlights the closest contest, where the winning margin was extremely small, showing high competition and voter split.

These KPIs help identify extreme cases and understand the competitiveness of elections.

4. Winning Margin by Constituency (Bar Chart)

DAX FORMULA:

```
Top Constituency
by Margin = VAR
TopRow =
TOPN(1,
VALUES(IndianGE2024_Cleaned_Constituency_Results[Constituency]
), [Winning Margin Value], DESC)
RETURN
    CONCATENATEX( TopRow,
IndianGE2024_Cleaned_Constituency_Results[Constituency], ", " )
```

This chart visualizes the top constituencies sorted by winning margin value. It clearly shows where elections were won by:

- Large margins (e.g., Tripura West)
- Moderate margins
- Smaller yet impactful margins

This visual helps in identifying strongholds and regions with high support for specific candidates.

5. **Winner Votes vs Margin Scatter Plot**

This scatter chart compares:

- Winner Votes Value (x-axis)
- Winning Margin Value (y-axis)

Each point represents a winning candidate, categorized by party. This chart allows users to:

- Compare how vote count relates to winning margin
- Identify patterns for strong parties
- Analyze whether higher votes always lead to higher margins

PARTY PERFORMANCE:

Fig:3

The **Party Performance** dashboard provides a comprehensive analysis of how different political parties performed in the election. It highlights seat distribution, vote share, and comparative performance across multiple dimensions to support data-driven insights.

Interactive Filters

- **State Name** – Analyze party performance for a selected state or across all states
- **Category** – Filter results by constituency category
- **Gender** – View performance based on candidate gender
- **Winner Party** – Focus on a specific winning party

These slicers enable dynamic exploration and customized analysis.

Seats Won by Winner Party (Bar Chart)
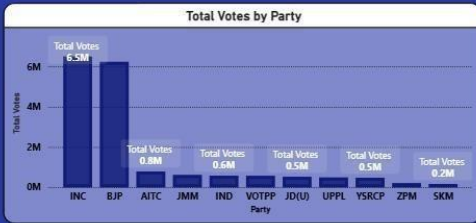
- Displays the **number of seats won by each political party**
- Helps quickly identify **top-performing parties**
- Useful for comparing dominance and representation among parties

Party Seat Share % and Seats Won (Pie Chart)

- Shows the **percentage share of seats** held by each party
- Combines **seat count and proportional representation**
- Helps understand the **overall political balance**

Total Votes by Party (Column Chart)

- Represents the **total votes received by each party**
- Highlights parties with strong voter support, even if seat count is lower
- Useful for comparing **vote share vs seat conversion**

Geographical Distribution (Map Visual)

- Displays **state-wise winning party distribution** on the map
- Helps visualize **regional strongholds and party influence**
- Enhances spatial understanding of election outcomes

STAE SUMMARY DASHBOARD:

The **State Summary Dashboard** provides a state-level analysis of election results. It helps compare party performance, vote distribution, winning margins, and seat outcomes across different states using interactive visuals.

Interactive Filters

- **State Name** – View insights for a specific state or all states
- **Category** – Filter data by constituency category
- **Party** – Analyze performance of a selected political party

These filters allow users to drill down and customize the analysis dynamically.
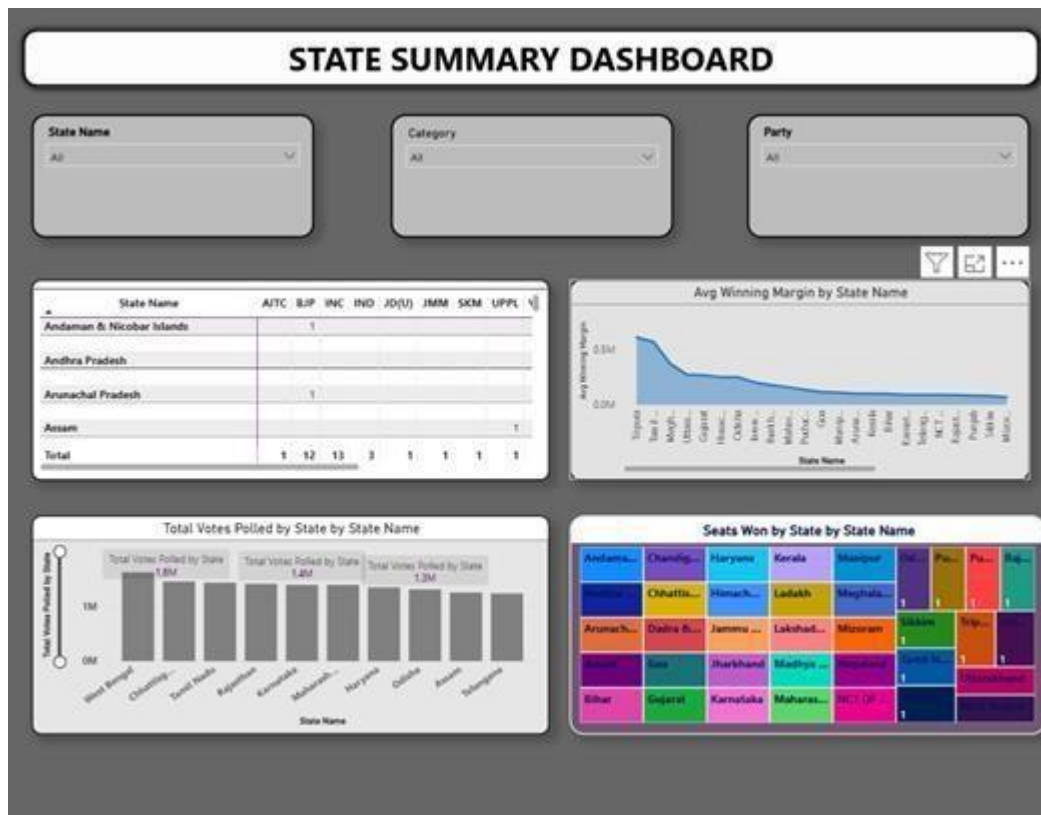
Fig: 4

Party-wise Seats by State (Table)

- Displays the **number of seats won by each party in every state**
- Enables quick comparison of **party dominance at the state level**
- The total row summarizes overall seat distribution

Average Winning Margin by State (Area Chart)

- Shows the **average margin of victory** across states
- Highlights states with **closely contested elections vs strong wins**
- Useful for identifying competitive regions

Total Votes Polled by State (Column Chart)

- Represents the **total number of votes polled in each state**
- Helps understand **voter participation and engagement**
- Enables comparison of turnout across states

Seats Won by State (Treemap)

- Visualizes **seat distribution by state**
- Larger blocks represent states with **higher seat counts**
- Helps quickly identify states with greater political representation

- **Data accuracy was verified** by cross-checking KPIs, totals, and aggregated values with the cleaned dataset.

- **All DAX measures were validated** to ensure correct calculations for totals, distinct counts, and winning margins.

- **Slicers (State, Winner Name, Party)** were tested to confirm they filter all visuals consistently across pages.

- **Relationships in the data model** were reviewed to ensure proper 1-to-many connections and smooth cross-filtering.

- **Visuals were checked for correctness**, including bar charts, pie charts, scatter plots, and tables, ensuring that the metrics reflect accurate summaries.

- **KPI cards were validated** for dynamic responsiveness when slicers are applied.

- **Dashboard layout and readability** were reviewed to ensure clear interpretation of election patterns and insights.

- **No calculation errors or broken visuals** were found during testing, and interactions performed as expected.

- Overall, the dashboards fulfil Milestone-2 requirements with **accurate data, correct modelling, and validated visual insights**.

GOALS FOR THE UPCOMING SPRINT:

- **Create advanced DAX measures** to provide deeper analytical insights and enhance dashboard functionality.

- **Build additional detailed dashboards** such as State-wise Analysis and Party Performance for improved data exploration.

- **Refine visual design and navigation** by improving formatting, adding buttons/bookmarks, and ensuring a smooth user experience.

MILESTONE 3:
DASHBOARD DEVELOPMENT & VISUALIZATION

Project Title : **ElectViz Election Data Visualization for Media**

Overview:

Milestone 3 focused on advanced dashboard development, interactivity enhancement, completion of DAX calculations, and thorough testing of the Power BI report. This phase aimed to deliver deeper analytical insights through additional dashboards while ensuring accuracy, performance, and usability of the solution.

Data Visualization [Indian General Election Overview Dashboard] page 1:

Fig:1
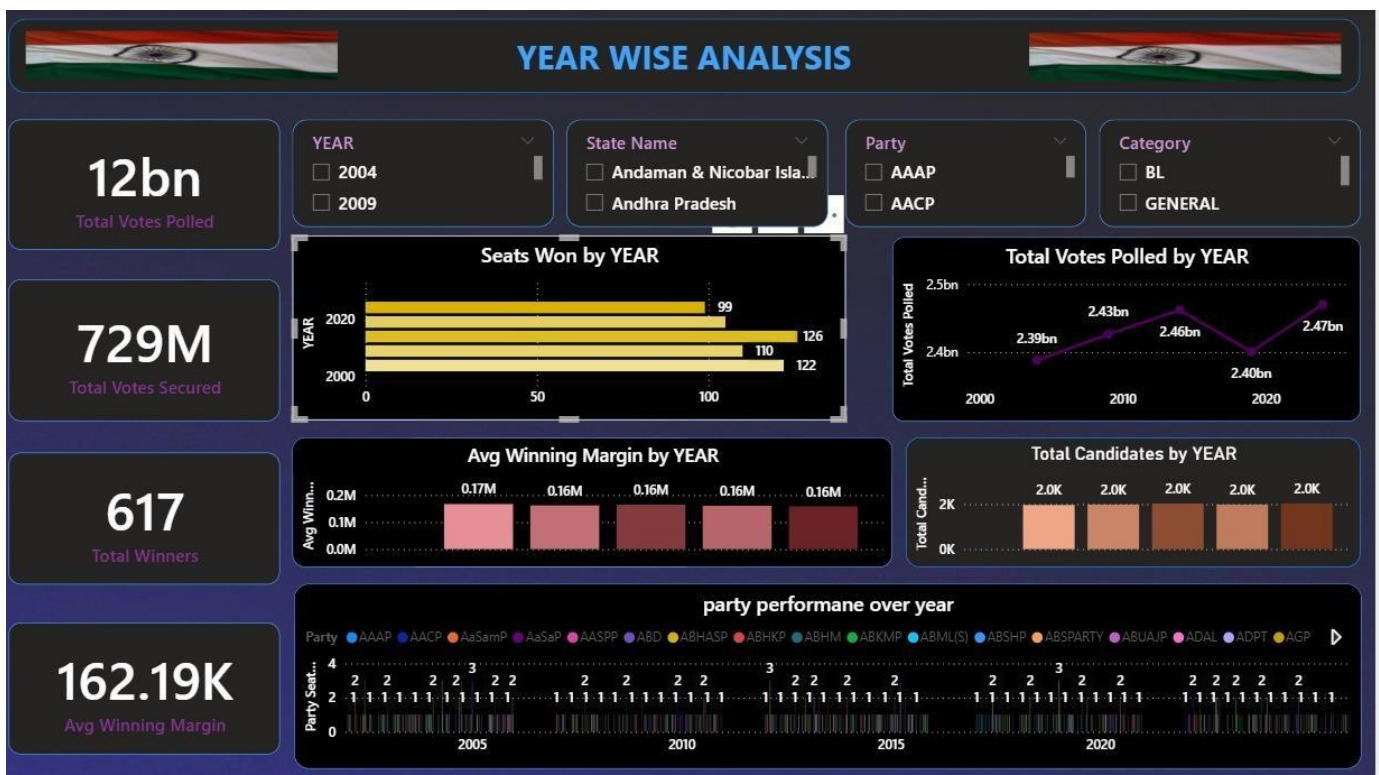
DAX FORMULAS:

Seat won by state Name =	Seats Won =
	 CALCULATE(
	         DISTINCTCOUNT('Indian General Election'[Constituency]),
	         'Indian General Election'[Is_Winner] = TRUE()
	)

Votes Polled by Year =	SUM('Indian General Election'[Total_Votes_Polled])

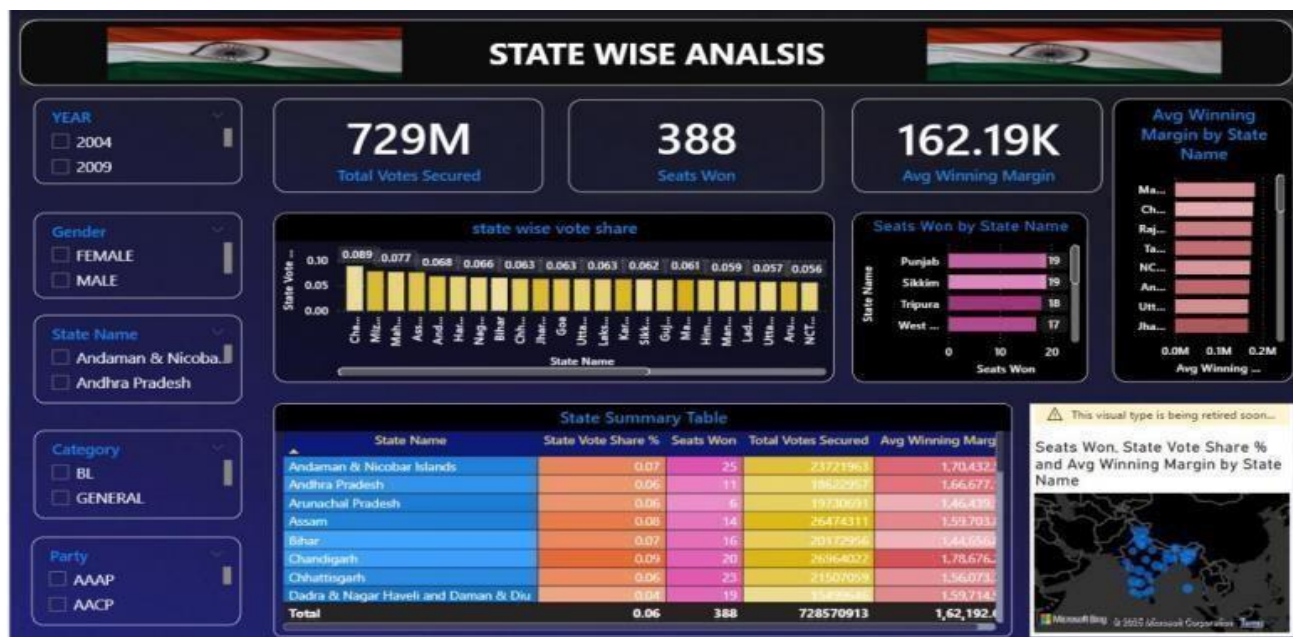|	
Party Vote Share =	SUM('Indian General Election'[Votes_Secured])

Seats Won =	CALCULATE(
	    DISTINCTCOUNT('Indian General Election'[Constituency]),
	    'Indian General Election'[Is_Winner] = TRUE()
	)

STATE WISE ANALYSIS[page 2]:

FIG:2

PURPOSE:

Provides a comprehensive analysis of election performance across different states to identify voting patterns, seat distribution, and winning margins.

State Vote Share Analysis

- Visualizes state-wise vote share percentages to compare voter support across regions.
- Helps identify states with higher or lower voter influence.

Seats Won by State

- Displays the number of seats won by each state.
- Enables comparison of political representation among states.

Average Winning Margin by State

- Highlights states with higher and lower winning margins.
- Helps assess closely contested versus strongly dominated states.

DAX FORMULAS:

Seats Won =	CALCULATE(DISTINCTCOUNT('Indian General Election'[Constituency]), 'Indian General Election'[Is_Winner] = TRUE())
Total Votes Secured =	SUM('Indian General Election'[Votes_Secured])
Vote Share % =	AVERAGE('Indian General Election'[Pct_of_Valid])
Avg Winning Margin =	AVERAGE('Indian General Election'[Winning_Margin])

PARTY PERFORMANCE [PAGE 3]:

PURPOSE:

Analyzes the performance of political parties by comparing votes, vote share, seats won, and winning margins to evaluate party effectiveness.
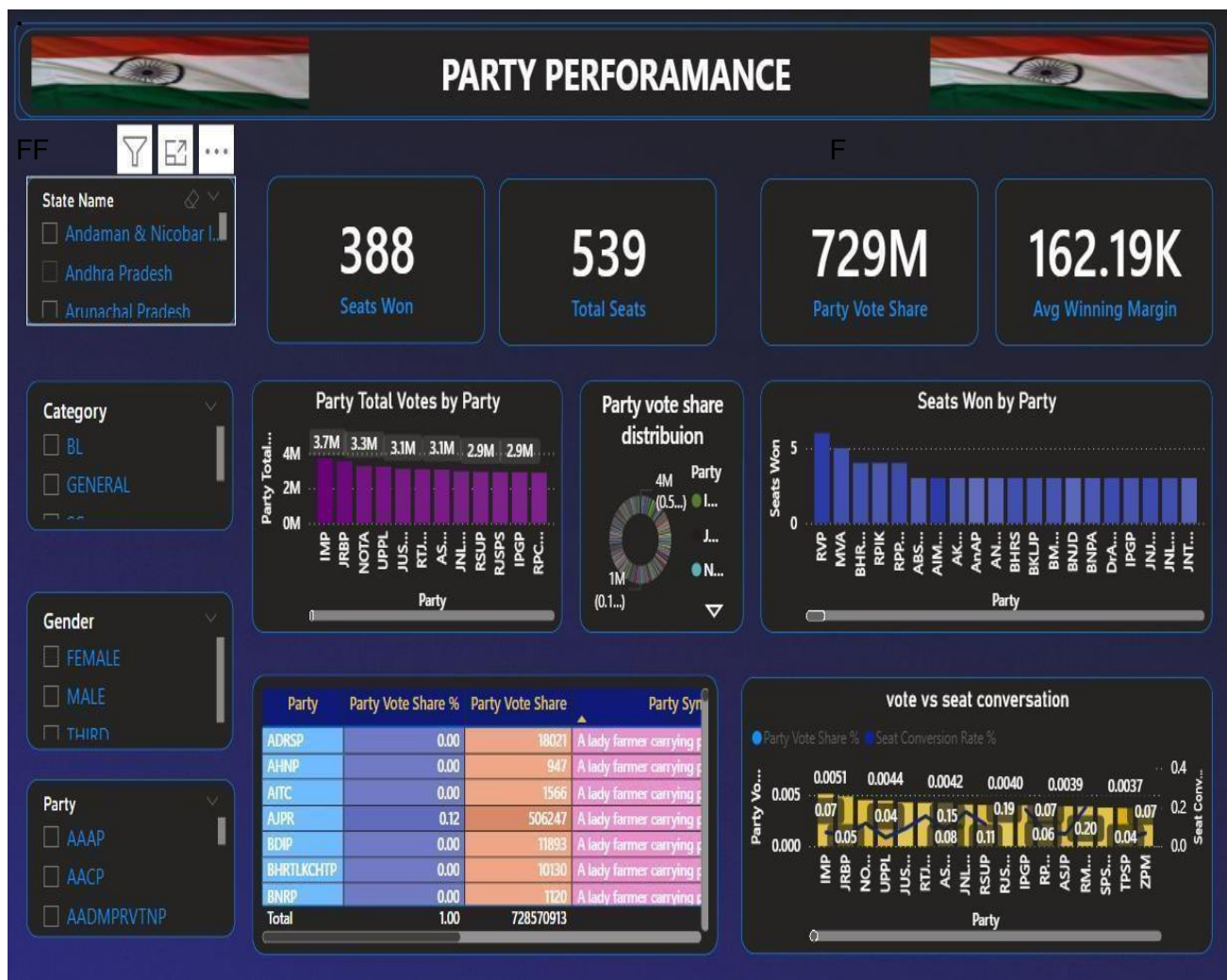

Fig:3

Key Performance Indicators (KPIs)

- **Seats Won:** Total number of seats secured by parties.
- **Total Seats:** Total constituencies considered in the analysis.
- **Party Vote Share:** Aggregate votes received by parties.
- **Average Winning Margin:** Average margin of victory across parties.

Party Total Votes Analysis

- Bar chart displays total votes received by each party.
- Helps identify parties with higher voter support.

Party Vote Share Distribution

- Donut chart shows the percentage contribution of each party to total votes
- Highlights dominant and minor parties.

Seats Won by Party

- Bar chart compares the number of seats won by each party.

- Enables analysis of parliamentary representation by party.

Vote Share vs Seat Conversion

- Combined chart compares **party vote share percentage** with **seat conversion rate**.

- Helps assess how effectively parties converted votes into seats.

DAX FORMULA:

|	
Seats Won =	CALCULATE(DISTINCTCOUNT('Indian General Election'[Constituency]), 'Indian General Election'[Is_Winner] = TRUE())
Total Seats =	DISTINCTCOUNT('Indian General Election'[Constituency])
Party Vote Share =	SUM('Indian General Election'[Votes_Secured])
Avg Winning Margin =	AVERAGE('Indian General Election'[Winning_Margin])
Party Total Votes =	SUM('Indian General Election'[Votes_Secured])
Party Seats Won =	CALCULATE(DISTINCTCOUNT('Indian General Election'[Constituency]), 'Indian General Election'[Is_Winner] = TRUE())
Total Seats =	DISTINCTCOUNT('Indian General Election'[Constituency]) Party Vote Share % = DIVIDE([Party Total Votes], CALCULATE(SUM('Indian General Election'[Votes_Secured]), ALL('Indian General Election'[Party])), 0)

CANDIDATES PERFORMANCES [PAGE 4]:
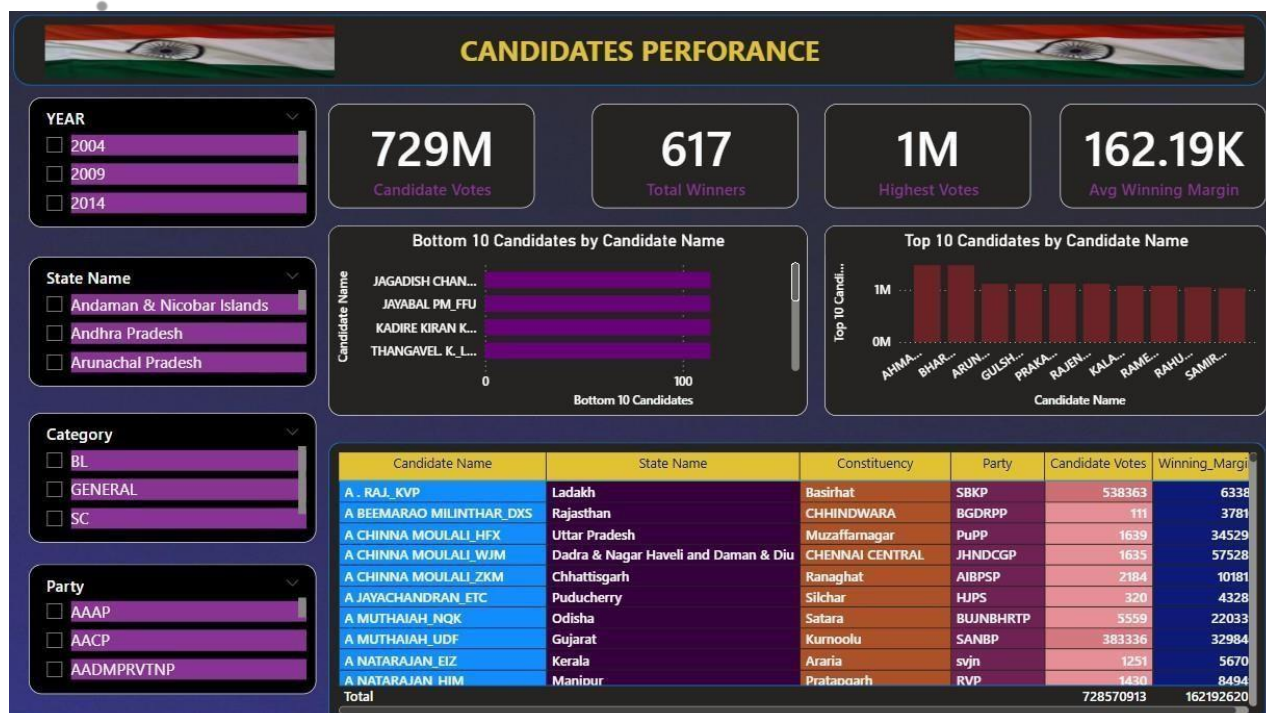
Fig:4

Purpose

- To analyze and compare the performance of individual candidates across elections.
- To understand voting patterns and competitiveness at the candidate level.

Key Performance Indicators (KPIs)

- **Total Candidate Votes:** Total votes secured by all candidates.
- **Total Winners:** Number of candidates who won their constituencies.
- **Highest Votes Secured:** Maximum votes received by a single candidate.
- **Average Winning Margin:** Average margin of victory across winners.

Top 10 Candidates by Votes

- Displays candidates with the highest vote counts.
- Helps identify popular and high-performing candidates.

Bottom 10 Candidates by Votes

- Shows candidates with the lowest vote counts.
- Highlights weaker electoral performance.

Candidate-wise Vote Analysis

- Compares vote distribution among candidates.
- Enables performance comparison across regions and parties.

Winning Margin Analysis

- Analyzes margins to understand closely contested and strong wins.
- Reflects competitiveness at the constituency level.

Candidate Summary Table

- Provides detailed information including candidate name, state, constituency, party, votes secured, and winning margin.
- Supports validation and detailed review.

DAX FORMULAS:

|	
Candidate Votes =	SUM('Indian General Election'[Votes_Secured])
Total Winners =	COUNTROWS(FILTER('Indian General Election', 'Indian General Election'[Is_Winner] = TRUE()))
Highest Votes =	MAX('Indian General Election'[Votes_Secured])
Avg Winning Margin =	AVERAGE('Indian General Election'[Winning_Margin])
Bottom 10 Candidates =	IF(RANKX(ALL('Indian General Election'[Candidate Name]), [Candidate Votes], , ASC) <= 10, [Candidate Votes])
Candidate Rank =	RANKX(ALL('Indian General Election'[Candidate Name]), [Candidate Votes], , DESC)
Top 10 Candidates =	IF([Candidate Rank] <= 10, [Candidate Votes])

YEAR WISE ANALAYSIS [PAGE 5]:
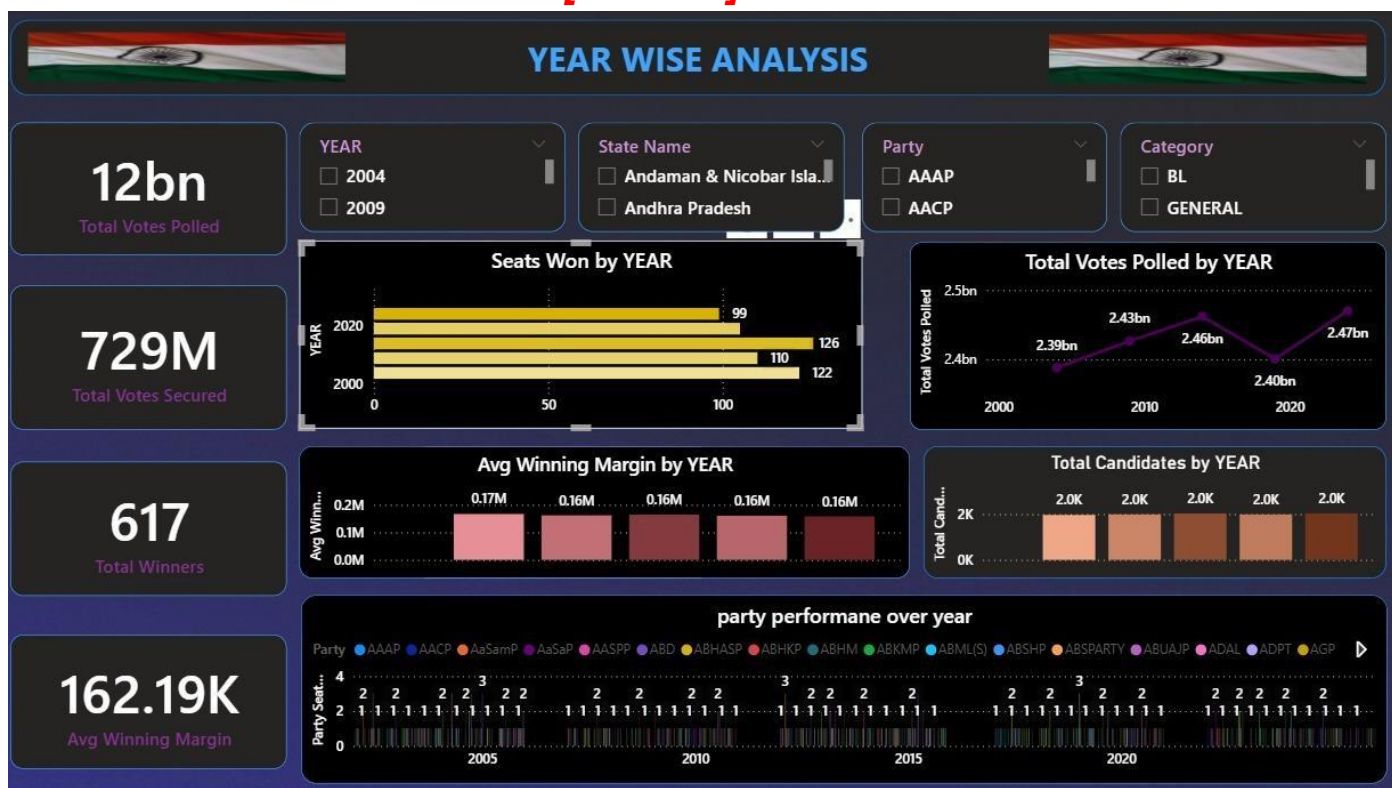
Fig:5

Purpose

- To analyze election trends and performance across different election years.
- To understand changes in voter participation, seat distribution, and candidate performance over time.
-

Key Performance Indicators (KPIs)

- **Total Votes Polled:** Represents overall voter turnout across years.
- **Total Votes Secured:** Indicates valid votes considered for analysis.
- **Total Winners:** Number of candidates who won in each election year.
- **Average Winning Margin:** Shows competitiveness of elections across years.

Seats Won by Year

- Compares the number of seats won across different election years.
- Helps identify variations in seat distribution over time.
-

Total Votes Polled by Year

- Visualizes year-wise voter turnout trends.
- Highlights growth or decline in voter participation between elections.

Average Winning Margin by Year

- Shows how competitive elections were in different years.
- Higher margins indicate strong wins, while lower margins show close contests.

Total Candidates by Year

- Displays the number of candidates contesting in each election year.
- Helps analyze competition intensity across elections.

DAX FORMULA:

Seats Won =	CALCULATE(DISTINCTCOUNT('Indian General Election'[Constituency]), 'Indian General Election'[Is_Winner] = TRUE())
Total Votes Polled =	SUM('Indian General Election'[Total_Votes_Polled])
Total Votes Secured =	SUM('Indian General Election'[Votes_Secured])
Total Seats =	DISTINCTCOUNT('Indian General Election'[Constituency])
Total Winners =	COUNTROWS(FILTER('Indian General Election', 'Indian General Election'[Is_Winner] = TRUE()))
Avg Winning Margin =	AVERAGE('Indian General Election'[Winning_Margin])
Party Seats Won =	CALCULATE(DISTINCTCOUNT('Indian General Election'[Constituency]), 'Indian General Election'[Is_Winner] = TRUE())

Testing Phase:

A systematic testing approach was followed to ensure the dashboard delivers **accurate results, reliable performance, and a smooth user experience**. Multiple testing techniques were applied to validate functionality, data accuracy, system performance, and usability.

1. *Functional Testing*

- Verified all **DAX measures, KPIs, and calculated fields** for correctness
- Tested **slicers, filters, drill-through features, and cross-page interactions**
- Ensured consistent behavior and functionality across all dashboard pages.

2. *Data Validation Testing*

- Cross-checked **vote counts, seat totals, and party results** with the source dataset
- Identified and corrected **missing, duplicate, or inconsistent data entries**
- Confirmed the accuracy of all **aggregated and derived values**

3. *Performance Testing*

- Optimized visual elements to reduce **dashboard load and refresh times**
- Tested performance under **multiple filter and slicer selections**

4. *Usability Testing*

- Evaluated **layout structure, visual clarity, and information flow**
- Maintained consistency in **color schemes, fonts, and labeling**
- Ensured dashboard readability and responsiveness across different screen sizes

Testing Outcome:

All dashboard components functioned as expected, delivering accurate insights with efficient performance and a consistent user experience.

REVIEW:

A final review was conducted to ensure overall dashboard quality, visual consistency, and alignment with project objectives. Layout, formatting, and data representation were verified across all pages. Minor refinements were applied to improve clarity, usability, and overall presentation quality.

CONCLUSION:

Milestone 3 marked the successful completion of all five dashboard pages along with the finalization of required DAX calculations and interactive features. Thorough testing was conducted to confirm data accuracy, system performance, and user usability. Overall, the developed dashboard delivers a dependable, interactive, and scalable solution for analyzing Indian General Election data effectively.

Milestone 4: Deployment And Documentation

In addition to the existing of **Milestone 3**, we have added a new dashboard to the project. This dashboard extends the analysis by presenting more detailed insights and improving the overall usability and completeness of the system.

Winning Analysis Dashboard:

Purpose

- The **Winning Analysis Dashboard** is designed to analyze election outcomes by focusing on winning candidates, parties, and constituencies across multiple election years.
- The main objective of this dashboard is to identify **winning patterns**, **party dominance**, **regional performance**, and **margin-based competitiveness** in elections.
- It helps stakeholders understand how election results vary by **year, state, party, and constituency**, supporting data-driven political and performance analysis.

FIG : 6

- **Year Slicer**:
  Allows users to filter the analysis by election year (2004, 2009, 2014, 2019), enabling year-wise comparison of winning trends.
- **KPI Cards**:
  - **Total Seats Won**: Displays the total number of seats won in the selected year(s).
  - **Total Winners**: Shows the count of winning candidates.
  - **Average Winning Margin (Party)**: Represents the average margin by which parties won their seats.
  - **Lowest Winning Margin**: Highlights the closest electoral victory, indicating highly competitive constituencies.
- **Seats Won by Party (Bar Chart)**:
  Visualizes party-wise seat distribution, helping identify dominant political parties and their relative performance.

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- **Winners Over Area / Year (Line Chart)**:
  Shows trends in the number of seats won over different years, enabling temporal analysis of election outcomes.
- **Winning Margin by Constituency (Bar Chart)**:
  Displays constituencies with the highest winning margins, helping identify strongholds and landslide victories.
- **Seats Won by State (Map Visualization)**:
  Provides a geographic view of seat distribution across states, highlighting regional performance and political influence.

DAX FORMULA:

Total Seats Won =	CALCULATE(DISTINCTCOUNT('Indian General Election'[Constituency]), 'Indian General Election'[Is_Winner] = TRUE())
Total Winners =	COUNTROWS(FILTER('Indian General Election', 'Indian General Election'[Is_Winner] =TRUE()))
Avg Winning Margin =	AVERAGE('Indian General Election'[Winning_Margin])
Lowest Winning Margin =	MIN('Indian General Election'[Winning_Margin])
Party Seats Won =	CALCULATE(DISTINCTCOUNT('Indian General Election'[Constituency]), 'Indian General Election'[Is_Winner] = TRUE())
State Seats Won =	CALCULATE(DISTINCTCOUNT('Indian General Election'[Constituency]), 'Indian General Election'[Is_Winner] = TRUE())
Total Seats Won =	CALCULATE(DISTINCTCOUNT('Indian General Election'[Constituency]), 'Indian General Election'[Is_Winner] = TRUE())

State Wise Map Analysis Dashboard:

Purpose

- The **State Wise Map Analysis Dashboard** is designed to provide a geographical perspective of election performance across Indian states.
- The primary objective of this dashboard is to analyze **state-level seat distribution**, **total votes secured**, **average winning margins**, and **voter turnout percentages**.
- It helps users identify **regional trends**, **high-performing states**, and **variations in voter participation** across different election years.
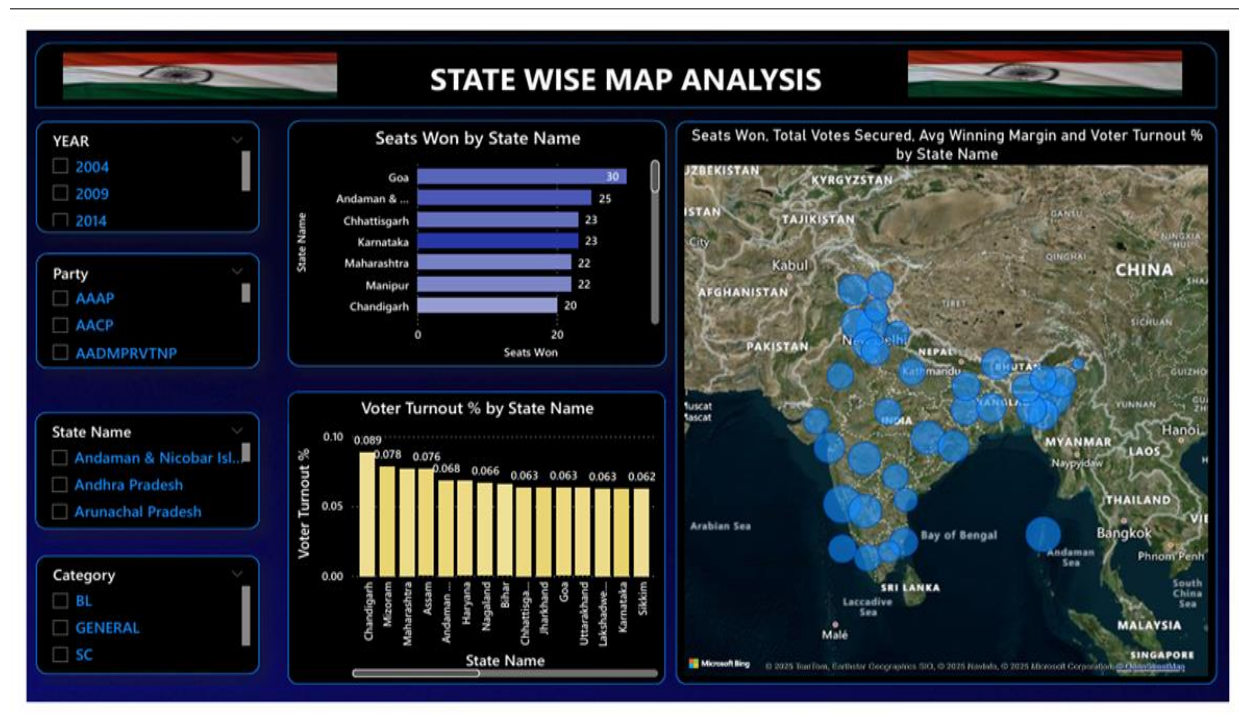

FIG: 7

- **Year, Party, State Name, and Category Slicers**:
Enable dynamic filtering of data by election year, political party, state, and reservation category (General, SC, BL), allowing customized analysis.

- **Seats Won by State Name (Bar Chart)**:
Displays the number of seats won in each state, helping compare state-wise political performance.

- **Map Visualization (Bubble Map)**:
Provides a geographic representation of India where bubble size reflects **seats won and total votes secured**, while tooltips display **average winning margin** and **voter turnout percentage**.
This visual helps quickly identify strong political regions and voter engagement levels.

- **Voter Turnout % by State Name (Bar Chart)**:
Highlights differences in voter participation across states, enabling analysis of electoral engagement and awareness.

DAX FORMULAS:

Seats Won =	CALCULATE(DISTINCTCOUNT('Indian General Election'[Constituency]), 'Indian General Election'[Is_Winner] = TRUE())
Total Votes Secured =	SUM('Indian General Election'[Votes_Secured])
Vote Share % =	AVERAGE('Indian General Election'[Pct_of_Valid])
Avg Winning Margin =	AVERAGE('Indian General Election'[Winning_Margin])

Demographic and Trend Analysis Dashboard:

Purpose

- The **Demographic and Trend Analysis Dashboard** is designed to analyze election results from a demographic perspective by examining **candidate participation**, **winning trends**, **gender representation**, **category-wise performance**, and **age distribution** over multiple election years.

- The primary goal of this dashboard is to identify **long-term trends**, **diversity patterns**, and **representation changes** in electoral outcomes across years, states, parties, genders, and categories.
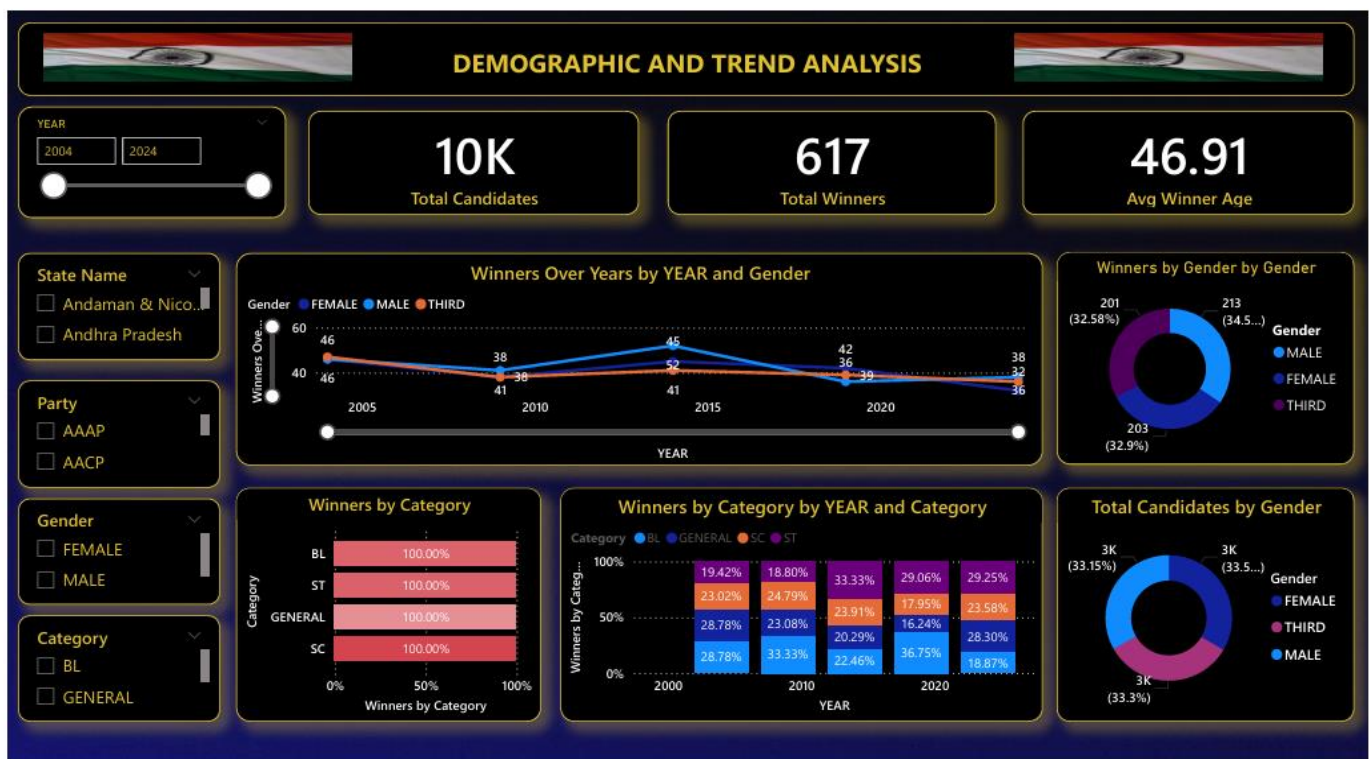

Fig: 7

- **Year Range Slicer (2004–2024)**:
Enables users to analyze trends across multiple election cycles and observe long-term changes.

- **State, Party, Gender, and Category Slicers**:
Allow customized filtering to focus on specific regions, political parties, gender groups, and reservation categories.

- **KPI Cards**:

  - **Total Candidates**: Displays the total number of candidates who contested elections.
  - **Total Winners**: Shows the total count of winning candidates.
  - **Average Winner Age**: Indicates the average age of elected candidates, highlighting generational trends.

- **Winners Over Years by Gender (Line Chart)**:
Visualizes year-wise trends of winners segmented by gender (Male, Female, Third), helping track representation changes over time.

- **Winners by Gender (Donut Chart)**:
Shows the proportion of winners across different gender categories.

- **Winners by Category (Bar Chart)**:
Displays the distribution of winners across reservation categories such as General, SC, ST, and BL.

- **Winners by Category by Year (Stacked Bar Chart)**:
Enables year-wise comparison of category-wise representation trends.

- **Total Candidates by Gender (Donut Chart)**:
Highlights gender participation levels among all candidates.

DAX FORMULA:

Total Winners =	COUNTROWS(FILTER('Indian General Election', 'Indian General Election'[Is_Winner] =TRUE()))
Avg Winner Age =	CALCULATE(AVERAGE('Indian General Election'[Age]), 'Indian General Election'[Is_Winner] = TRUE())
Winners by Gender =	CALCULATE(DISTINCTCOUNT('Indian General Election'[Candidate Name]), 'Indian General Election'[Is_Winner] = TRUE())
Winners by Category =	CALCULATE(DISTINCTCOUNT('Indian General Election'[Candidate Name]), 'Indian General Election'[Is_Winner] = TRUE())
Avg Winner Age =	CALCULATE(AVERAGE('Indian General Election'[Age]), 'Indian General Election'[Is_Winner] = TRUE())

Winners Over Years =	CALCULATE(DISTINCTCOUNT('Indian General Election'[Candidate Name]), 'Indian General Election'[Is_Winner] = TRUE())
Total Candidates =	DISTINCTCOUNT('Indian General Election'[Candidate Name])
Total Seats Won =	CALCULATE(DISTINCTCOUNT('Indian General Election'[Constituency]), 'Indian General Election'[Is_Winner] = TRUE())

Deployment:

The **deployment phase** involved publishing the finalized dashboards to a centralized and accessible environment to enable end-user interaction and analysis. After completing development, validation, and testing activities, all dashboards were deployed to the **Power BI Service** for secure and reliable access.

The deployed solution was configured with appropriate **data refresh settings** to ensure that reports reflect the most up-to-date information. **User access controls and sharing permissions** were defined to allow authorized users to view and interact with the dashboards while maintaining data security.

Post-deployment checks were conducted to verify **dashboard performance**, **visual responsiveness**, and **filter interactions** across all report pages. This ensured smooth navigation, accurate KPI calculations, and consistent behavior of slicers and visuals.

Overall, the deployment enables stakeholders to access insights anytime through a web browser, supports scalability, and allows future enhancements without disrupting existing functionality.

Documentation

- Comprehensive documentation was prepared to ensure clear understanding, effective usage, and easy maintenance of the developed dashboards. The documentation serves as a reference for both **technical users** (developers, analysts) and **non-technical users** (mentors, stakeholders).

- The technical documentation includes detailed information about **data sources**, **data cleaning and preprocessing steps**, **data modeling techniques**, and **relationships between tables**. It also explains the **DAX measures and calculated columns** used for KPIs, trends, and analytical visuals, ensuring transparency in how insights are generated.

- In addition, the documentation describes the **dashboard structure**, **visual components**, **slicers**, and **cross-filtering behavior** across all report pages. This helps users understand how to navigate the dashboards, apply filters, and interpret charts, maps, and KPI cards correctly.

- User documentation and guidelines were also created to support smooth adoption. These guidelines explain how to access the dashboards, interact with visuals, export reports, and use insights for decision-making. Overall, well-maintained documentation ensures knowledge transfer, supports future enhancements, and enables long-term sustainability of the solution.

Presentation

- A structured project presentation was conducted for the **Infosys Springboard mentor and academic guide**, followed by a live walkthrough of the deployed dashboards.
- The session began with an overview of the problem statement and the analytical objectives addressed through the project.
- The dashboards were demonstrated live using **Power BI Service**, showcasing interactive features such as year-wise election trends, state-wise and party-wise performance analysis, candidate-level insights, and KPI-driven summaries.
- Special emphasis was placed on explaining how DAX-based calculations dynamically update in real time when filters and slicers are applied.
- The presentation also highlighted report accessibility across both desktop and mobile devices, ensuring usability on multiple platforms.
- Additionally, the deployment approach, automated data refresh process, and supporting documentation were discussed to provide a complete view of the system lifecycle.

During the session, valuable feedback was received, which was later incorporated by improving visual clarity, refining labels and tooltips, and enhancing KPI alignment and formatting to improve overall readability and user experience.

Final Review

- Verified accuracy and consistency of all KPIs across dashboards
- Tested slicers, filters, drill-downs, and map interactions
- Optimized DAX measures for better performance under filters
- Validated deployment access and scheduled data refresh
- Ensured dashboard usability for academic review and portfolio use
- Reviewed design clarity and alignment with project objectives

Challenges Faced

- Understanding and cleaning large election datasets with inconsistent formats.
- Handling missing, duplicate, and mismatched data across different years.
- Designing an optimized data model to support multiple dashboards.
- Creating accurate DAX measures for KPIs, margins, and trend analysis.
- Ensuring consistent filter and slicer behavior across all report pages.
- Optimizing dashboard performance with multiple visuals and complex calculations.
- Implementing geographic mapping with correct state-level alignment.
- Managing version changes and dashboard enhancements across milestones.
- Deploying dashboards with proper access control and refresh settings.
- Preparing clear documentation and presentation-ready explanations.

Outcome

The project successfully delivered a comprehensive and interactive Power BI dashboard solution that enables detailed analysis of election data across multiple dimensions, including year-wise, state-wise, party-wise, and demographic perspectives. Accurate KPIs and insights were achieved through optimized DAX calculations and a well-structured data model. The dashboards provide smooth interactivity through slicers, maps, and drill-down visuals, ensuring an intuitive user experience. The solution was securely deployed on the Power BI Service with reliable data refresh functionality, supported by complete technical and user documentation. Overall, the project meets academic requirements and serves as a strong portfolio-ready analytical solution.