IIT Madras B.S. Degree

Data Visualization Design

Group project

Data Visualisation Project (May-2024)

Project Title

Boosting Voter Turnout: Insights from Our Worker Community

Overview

In a large worker community where multiple factory units are owned by the same company, the workers, ranging from managers and engineers to truck drivers and cleaners, are preparing for the upcoming union election. The community is bustling with discussions and debates as workers from various classes voice their concerns and hopes for the future of their workplace. The union aims to address issues that affect all employees, ensuring fair treatment, safety, and equal opportunities for everyone.

The union leaders have noticed a troubling trend over the past few election terms: A significant number of workers are not participating in the union elections. This lack of participation has raised concerns about whether the union truly represents the interests and needs of all its members. To address this issue, the union committee has conducted a comprehensive survey to understand the reasons behind the low voter turnout.

The survey aims to gather insights into the workers' perspectives on various topics, including their trust in the voting process, personal reasons for not voting, and broader concerns about the workplace environment. The committee hopes that by analyzing this data, they can implement strategies to increase voter participation and ensure that the union elections are more representative of the entire worker community.

You have been provided with a dataset that contains the responses from this survey. Each column(s) in the dataset represents a specific question from the survey, and the values indicate the options selected by the respondents. Additionally, a PDF document with the complete list of questions is available to provide context and details for each survey item.

Your task is to analyze this dataset and create visualizations that effectively communicate the key findings. The goal is to provide insights that can help the union leaders and council members understand the barriers to voting and develop strategies to encourage greater participation in future elections.

Get your Resources

Get Dataset

Questionnaire

Topics to Explore

These are few questions that can be answered using analysis and visualizations.

- Investigate the relationship between voter turnout in union elections and various demographic factors such as age, gender, job role, length of employment, and education level. Identify any significant patterns or trends that emerge from the data.

- Analyze the primary reasons employees provide for not participating in union elections. Examine how these barriers vary across different demographic groups and identify any common themes. Provide insights into the most significant obstacles to voter participation.

- Explore employees' perceptions of union representatives and company leadership. Assess how trust and confidence in these leadership bodies influence voting behavior. Investigate any correlations between leadership perceptions and voter turnout.

- Examine the relationship between overall workplace satisfaction, including work-life balance, job security, and experiences of workplace conflicts, and voting behavior in union elections. Determine how these factors affect employees' likelihood to vote.

- Evaluate the effectiveness of different voting methods and election campaign strategies on voter turnout. Analyze which methods and strategies are perceived as most secure, accessible, and motivating by the employees. Provide recommendations for improving future voting processes.

- Investigate the connection between employees' engagement in non-voting community activities (e.g., community meetings, events) and their voting behavior in union elections. Assess how overall community involvement influences electoral participation.

continued

Dataset description

The provided dataset contains three types of columns:

1. **Column 1**: This represents a unique response ID for each respondent.
2. **Columns 2 to 8**: These columns contain demographic information about each respondent.
3. **Columns 9 to 115**: These columns represent each survey question, with the values indicating the selected response option.

Question Formats in the Dataset:

There are two main formats for the questions in the dataset:

1. Single-Option Questions:

Example: "In general, how easy or difficult do you think it is to vote in union elections?"

1. Very easy
2. Somewhat easy
3. Somewhat difficult
4. Very difficult

For this type of question, the column name is formatted as `**Q[question number]**`, and the values in the column corresponding to the respondent's selected option.

2. Multiple-Option Mapping Questions:

Example: "When thinking about a union election, how confident are you that each of these methods of voting is secure and safe from tampering?"

- 1. In-person voting machines
- 2. Paper ballots cast in person
- 3. Paper ballots submitted by mail
- 4. Electronic votes submitted online or by email

Options:

- 1. Very confident
- 2. Somewhat confident
- 3. Not very confident
- 4. Not at all confident

continued

For this type of question, respondents map their confidence level to each voting method. The format for these columns is `Q[question number]_[option number]`. For instance, if Q15 has four options and four confidence levels, there will be four columns for Q15, named Q15_1, Q15_2, Q15_3, and Q15_4. The value in each column indicates the respondent's confidence level for that specific option.

For example, if the value in the Q15_1 column is 1, it means the respondent is "Very confident" about "In-person voting machines." This pattern continues for each option and corresponding opinion.

Deliverables

Visualizations:
Produce interactive and visually captivating data visualizations for each question and integrate these visuals into a cohesive and engaging dashboard/chart.

Presentation:
Present your voter turnout project to the class, explaining the insights gained from the visualizations using a presentation.

Code & Documentation:
Provide well-structured and documented code for data preprocessing and all visualizations

Note

You can use any programming language or tools you believe are suitable for this project and should be prepared to describe and explain your choices.

We encourage the use of data visualization to effectively communicate your findings and hypotheses and create a compelling narrative.

Criteria	Points
Approach: Clear and well-reasoned approach to the problem, including appropriate analytical and coding techniques	**10**
Data analysis & Findings: Effective use of data analysis techniques to extract interesting observations from data that clearly answer the questions	**20**
Data visualization: Effective use of data visualizations to communicate findings and tell a compelling story	**30**
I**mplications:** Clear and insightful implications for the client and their research and development department	**10**
Constraints and improvements: Clear and well-supported recommendations for improving the project or addressing any constraints or limitations	**5**
Presentation: Professional and engaging presentation, with effective communication	**10**
Technical Appendix: Clear, well-documented, and readable code or pseudocode, with appropriate comments and documentation	**10**
Consistent progress: Meeting or exceeding weekly goals and targets	**5**

Roadmap for completing the project in Three weeks

Week-1

(Data Understanding and Preprocessing)

- Familiarize yourself with the dataset's columns, structure, and information.
- Identify any missing values, outliers, or inconsistencies in the data.
- lean and preprocess the data, ensuring it's ready for analysis

Week-2

(Exploratory Data Analysis and Visualization)

- Develop exploratory data analysis questions for each aspect of the project.
- Choose appropriate visualization techniques for each question without specifying plot types.
- Create initial visualizations based on the topics and data.
- Begin working on designing the interactive dashboard framework/ chart

Week-3

(Dashboard Completion and Presentation Preparation)

- Refine and enhance the visualizations & Integrate them into an interactive dashboard platform/ form a chart.
- Prepare a presentation showcasing your project, highlighting key insights, and explaining your visualization choices.
- Finalize the technical appendix, ensuring it is clear, concise & well-documented.