Course Title: IFT 533 – Data Visualization & Reporting for IT

Team Number: 28

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Project - Phase II: Decision Making

Due Date: November 24, 2024

“SECTION 1:”

We are using Tableau as it is a user-friendly tool that allows everyone to use for data visualization and it can also deal with large data sets it has many interactive features that help in filtering and controlling the data which is very much needed while doing a visualization because of this kind of features it helps users to drive into more data insights, It has great options in charts for visualizing, for example, Bar chart, line, Map, etc. and more color to represent the data beautifully this helps to dig into more data insights. We can link data from other external sources like Excel, txt files, and SQL it also creates tables according to the file and it has a calculated field that helps in manipulating the data because of that when new data is added the map gets updated according to the data.

If we compare it with Excel, Tableau is great because it supports large data sets and has good interactive features. The Python Bokeh library requires a lot of code to create dashboards, but in Tableau, it is faster for non-coders to design dashboards according to the requirements.

“Section 2:”

Yes, our data requires data preprocessing we cleaned the missing values and replaced the missing values with other values, we have separated the columns for time and date as we need to represent the time over the day of the week and are going to perform normalization for police deployed and standardization for other crime related fields, removing unwanted columns and requiring a small data validation for crime description and crime as it is the major column and to ensure the data is correct.

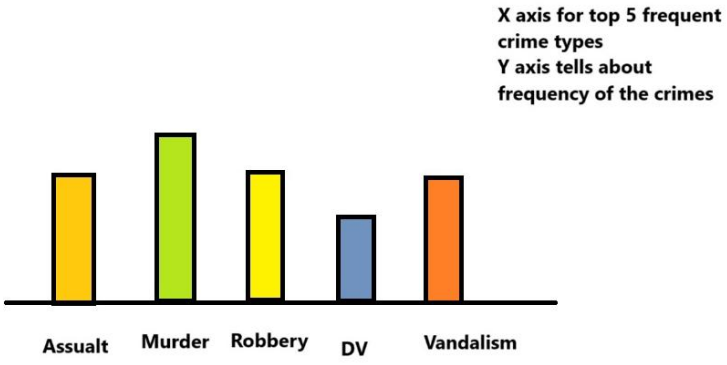
“Section 3:”

“List of final questions:”

1. What are the top 5 most frequent crime types?
2. How does the distribution of crimes vary across cities?
3. What is the monthly trend of reported crimes over time?
4. How does the crime rate vary by time of day and day of week?
5. Which weapons are most commonly used in violent crimes?
6. What is the geographic distribution of crimes across India?
7. What is the case closure rate by crime type?
8. What is the age distribution of crime victims by gender?
9. What is the average time to close a case for different crime types?
10. How does the crime rate correlate with the number of police deployed?

“Section 4:”

Q 1 :



Top 5 Most Frequent Crime Types

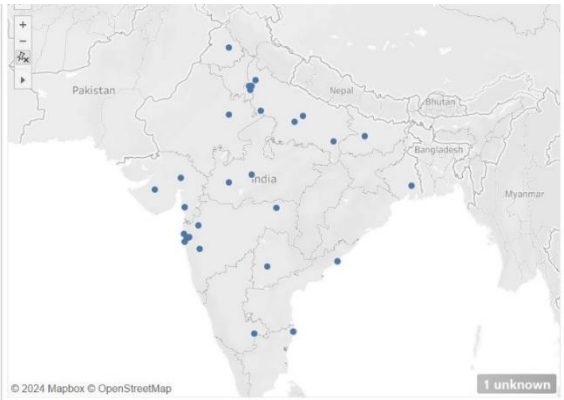
Best Representation: Bar Chart

Simple vertical bars with distinct colors representing different crime types on the x-axis and frequencies on the y-axis.

Usefulness: This chart effectively compares the frequencies of crimes, making it easy to identify the most and least common types through the visual height of each bar.

Pre-attentive Attribute: Length is the primary pre-attentive attribute, clearly reflecting the frequency of each crime type.

Q 2:



Distribution of Crimes Across Cities

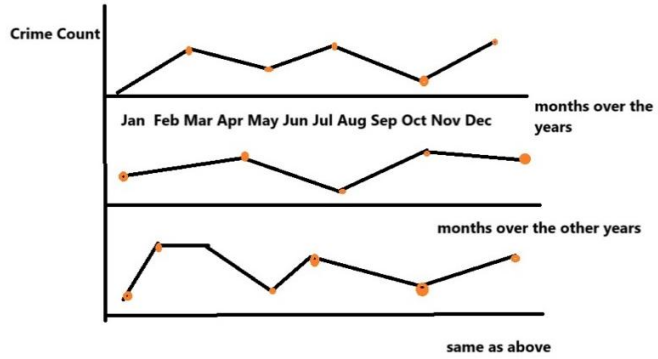
Best Representation: Map with Data Points

The map displays geographic distribution of crimes across various cities in India. Each point on map represents city & size or intensity of points indicates volume of crimes in that location.

Usefulness: This visualization is effective for identifying crime hotspots, regional patterns & areas requiring policy interventions to ensure better safety measures.

Pre-attentive Attribute: Position is the primary pre-attentive attribute, helping to locate cities quickly, while point size or intensity aids in assessing crime frequency.

Q 3:

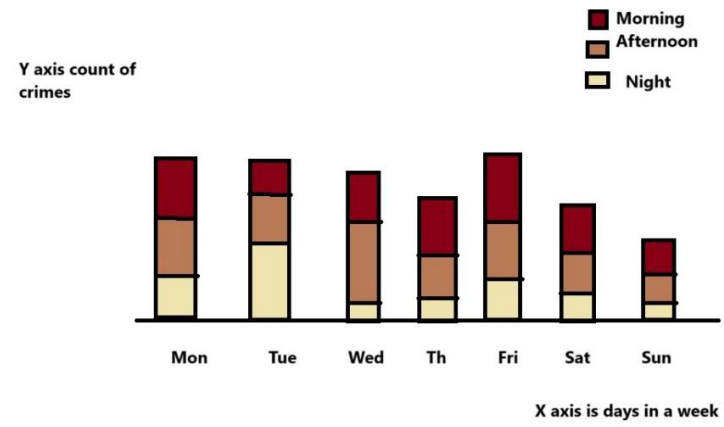


Monthly Trend of Reported Crimes Over Time

This graph provides a comprehensive view of the monthly trends in reported crimes over different years. By plotting time (months) on the x-axis and the number of crimes on the y-axis, it helps uncover seasonal variations and long-term changes in crime patterns. This visualization is particularly valuable for identifying periods of increased or decreased criminal activity, allowing for strategic intervention planning and resource allocation to address high-crime seasons effectively.

Pre-attentive Attribute: The slope and length of the lines serve as pre-attentive attributes, highlighting fluctuations and trends over time.

Q 4:

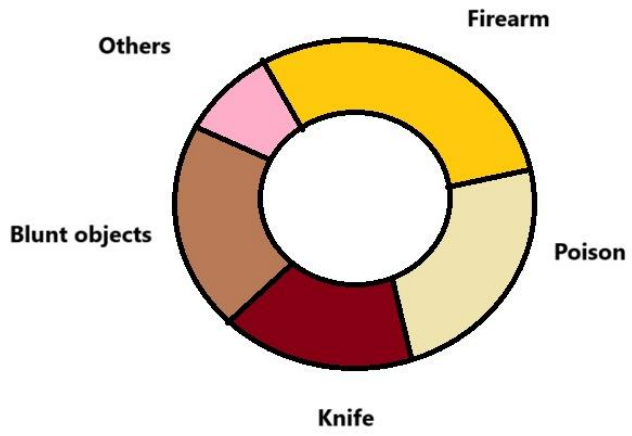


Crime Rate by Time of Day and Day of Week

This graph offers a thorough summary of how crime occurrences vary by time of day (morning, afternoon, and night) and across the days of the week. Each day is represented on the x-axis, while the y-axis shows the total crime count, with stacked segments representing the time intervals. This visualization is a valuable tool for identifying patterns in crime rates, helping to pinpoint specific times and days with the highest criminal activity. Such insights can inform resource allocation and policy measures to address high-risk periods effectively.

Pre-attentive Attribute: Length is the pre-attentive attribute as it conveys the total crime count for each day, while color differentiates the time intervals for additional detail.

Q 5:



Weapons Most Commonly Used in Violent Crimes

This graph provides a thorough summary of distribution of weapon types most frequently used in violent crimes. Each segment of Donut chart represents a weapon type, with size of the slice corresponding to its proportional usage. This visualization is valuable tool for identifying which

weapons are most commonly associated with violent incidents, enabling targeted policy-making & crime prevention strategies.

Pre-attentive Attribute: Angle is primary pre-attentive attribute, as it reflects proportion of each weapon type in overall dataset.

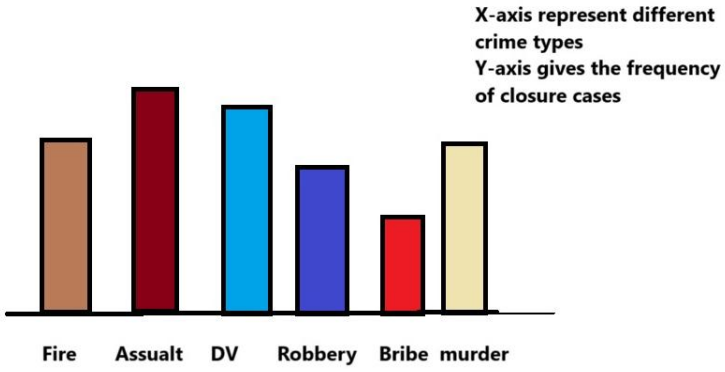
Q 6:

Geographic Distribution of Crimes Across India

This graph provides a thorough summary of the spatial distribution of various crime types across Indian cities. Different colors represent distinct crime domains, with markers placed on cities to indicate the occurrence and density of crimes. This map is a valuable tool for identifying regional crime trends, pinpointing high-risk areas, and formulating targeted strategies for crime prevention and resource allocation.

Pre-attentive Attribute: Color is the primary pre-attentive attribute, differentiating crime types, while the position of the markers highlights specific locations affected by each crime.

Q 7:

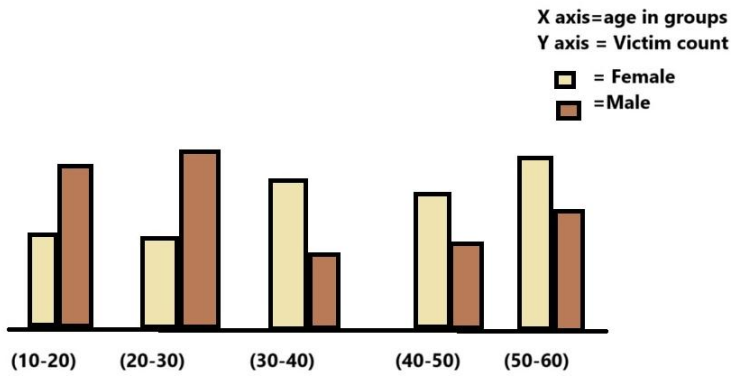


Case Closure Rate by Crime Type

This graph offers a thorough summary of the case closure rates for various crime types, including fire incidents, assault, domestic violence (DV), robbery, bribery, and murder. Each bar represents a crime type, with its length reflecting the closure rate percentage. This visualization is a valuable tool for identifying disparities in case resolution across different crimes, highlighting areas where law enforcement may need to allocate additional resources or refine strategies.

Pre-attentive Attribute: Length is the primary pre-attentive attribute, effectively representing the closure rate of each crime type.

Q 8:

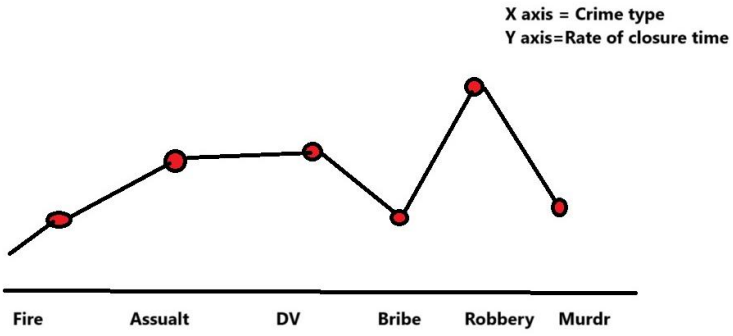


Age Distribution of Crime Victims by Gender

This graph provides a thorough summary of the age-wise distribution of crime victims, categorized by gender. Each age group on the x-axis is represented with separate bars for male and female victims, while the y-axis indicates the number of victims. This visualization is a valuable tool for identifying gender-based disparities in crime victimization across different age brackets. It highlights patterns that can inform targeted interventions and preventive strategies.

Pre-attentive Attribute: Length is the primary pre-attentive attribute, as it clearly shows the count of victims in each category.

Q 9:

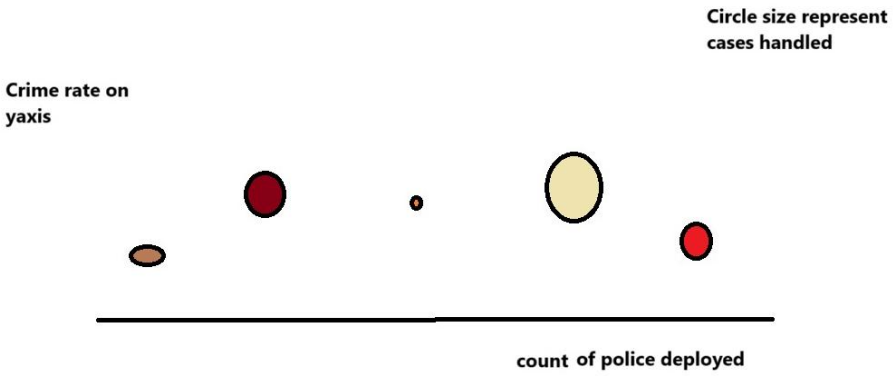


Average Time to Close a Case by Crime Type

This graph offers a thorough summary of the variations in average closure times for different crime types, including fire incidents, assault, domestic violence (DV), bribery, robbery, and murder. Each point represents the average time taken to close cases of a specific crime type, with the x-axis listing the crime types and the y-axis indicating closure times. This visualization is an effective tool for identifying patterns, outliers, and areas where case resolution may need improvement, enabling focused interventions to streamline closure rates.

Pre-attentive Attribute: Position is the primary pre-attentive attribute, highlighting the differences in closure times across crime types.

Q 10:



Crime Rate vs. Number of Police Deployed

This graph offers a thorough summary of the relationship between police deployment and crime rates, with bubble sizes indicating the number of cases handled. The x-axis represents the count of police deployed, while the y-axis shows the crime rate. This visualization is a valuable tool for analyzing correlations between resource allocation and crime levels, identifying areas where police resources are most effectively utilized or where additional deployment may be necessary.

Pre-attentive Attribute: Size is the primary pre-attentive attribute, as it reflects the number of cases handled, while position captures the relationship between deployment and crime rate.

“Section 5”

This dashboard incorporates interactive controls to enhance user analysis of crime data. A Date Range Slider allows users to filter visualizations, such as monthly trends, crime rate patterns, and case closure analysis, by selecting a specific time range (January 2020 to December 2024). A Geographic Filter, in the form of a searchable multi-select dropdown, enables comparisons of

crime distribution and geographic maps across multiple cities like Delhi, Mumbai, and Bangalore. The Crime Type Selector uses a hierarchical dropdown to categorize crimes into main and sub-categories (e.g., Violent Crime, Fire Accident), filtering visualizations like crime distribution, weapon analysis, and case closure rates.

Demographic Controls include radio buttons for gender (M, F, X) and a dual-handle slider for age (0-100 years), which refine age and victim demographic visualizations. A Case Status Filter uses a three-state toggle switch (Open/Closed/All) to adjust case closure and investigation timeline visuals. Additionally, a Measure Selector single-select dropdown allows users to switch between metrics such as count, percentage, or rates per 100,000, dynamically updating all relevant charts.

These controls provide intuitive and responsive interactions, allowing users to analyze temporal patterns, compare city-specific crime rates, focus on particular crime types, examine demographics, track case resolution metrics, and toggle between measurement scales. The system ensures all visualizations instantly reflect the applied filters for a seamless and efficient user experience.

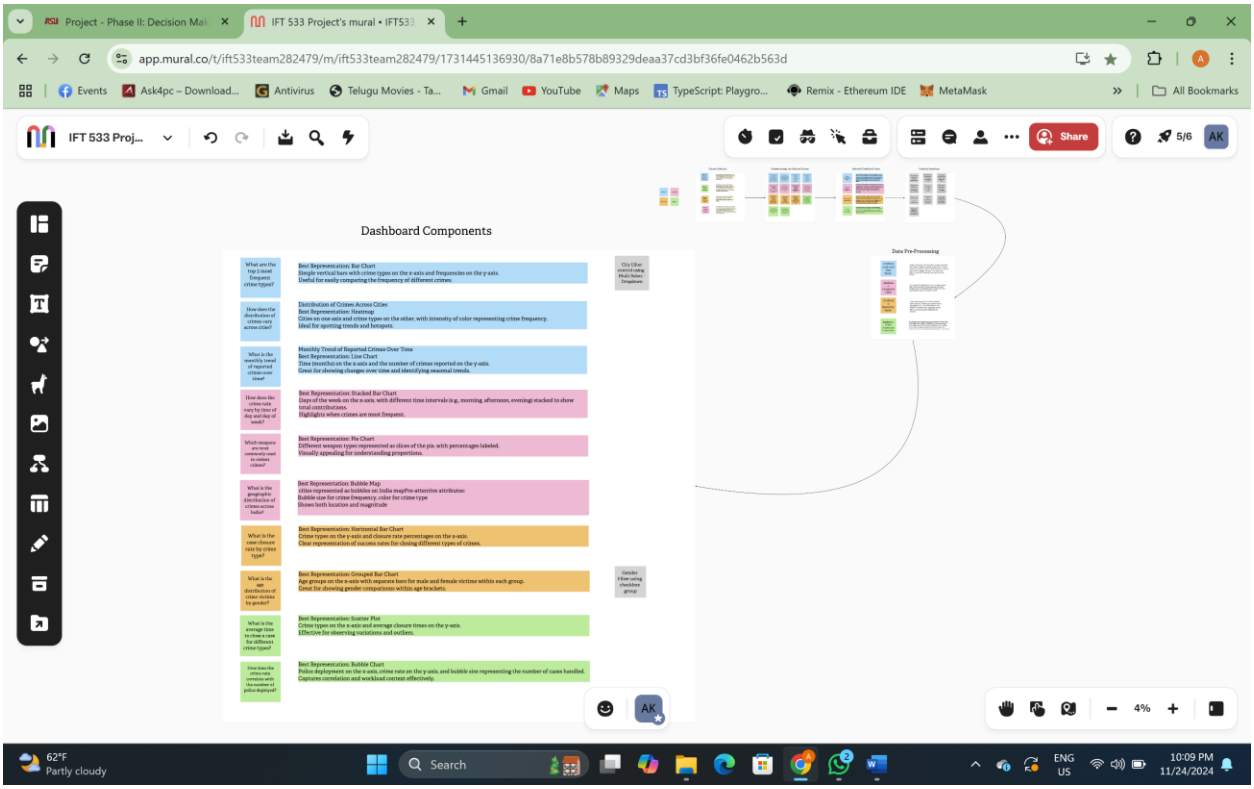
“Section 6”

Dataset Link:

“https://www.kaggle.com/datasets/sudhanvahg/indian-crimes-dataset”

“**Dashboard Link for Mural**:”

“https://app.mural.co/t/ift533team282479/m/ift533team282479/1731445136930/8a71e8b578b89329deaa37cd3bf36fe0462b563d”



Dashboard Components