

Crime Analysis Dashboard using Tableau

1. Introduction

This project aims to analyse and visualize crime data to help law enforcement agencies understand crime patterns and trends. The dashboard provides an interactive overview of crimes reported across different locations, time periods, and categories. Using Tableau, various analytical views such as geographical mapping, temporal analysis, trend visualization, and comparative study are developed to support decision-making and crime prevention strategies.

2. Step-by-Step Process

Step 1: Create the Overall Crime Distribution Map

Action:

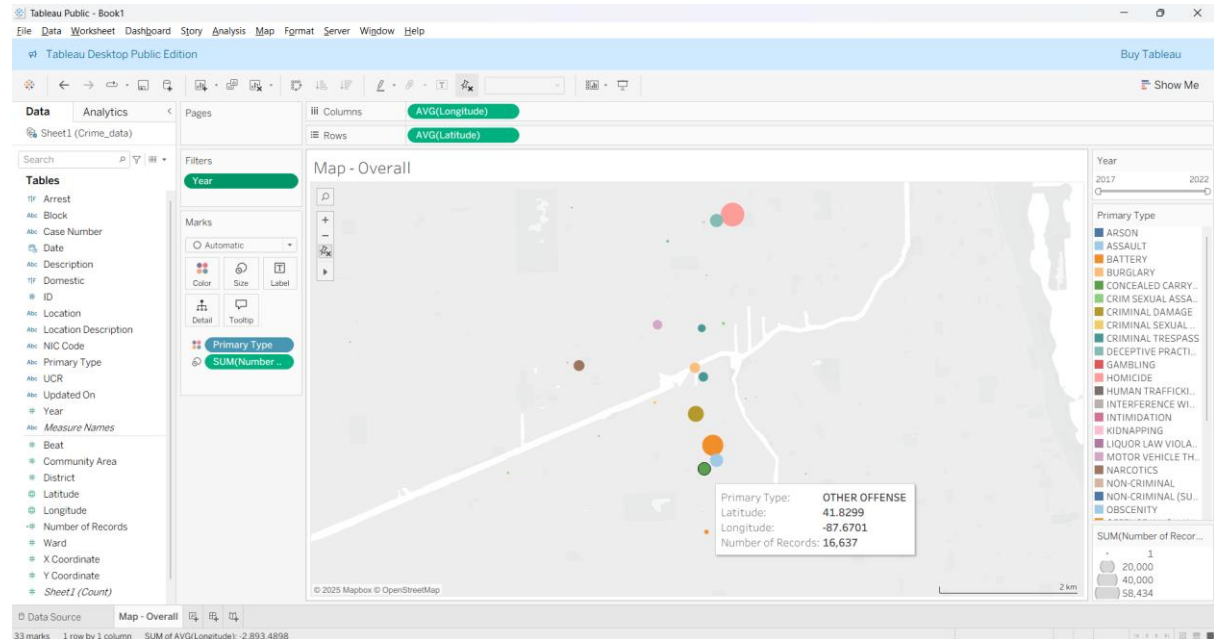
Loaded the *Crime_data.xlsx* dataset into Tableau and created the first worksheet, “Map – Overall”. Latitude and Longitude fields were used to generate a geographic map showing all reported crime locations.

Supporting Work:

- Assigned geographic roles to the Latitude and Longitude fields.
- Added *Primary Type* to the Color shelf to differentiate crime categories.
- Added *Year* as a filter to allow users to explore crimes across different years.
- Adjusted the map style using Map Layers for a cleaner background and better visibility.

Value:

The map provides a high-level spatial overview of criminal activity. It allows quick identification of areas with higher crime density and helps in understanding spatial patterns across the city



Step 2 – Documentation (PDF Section)

Step 2: Create KPI 1 – Total Crimes

Action:

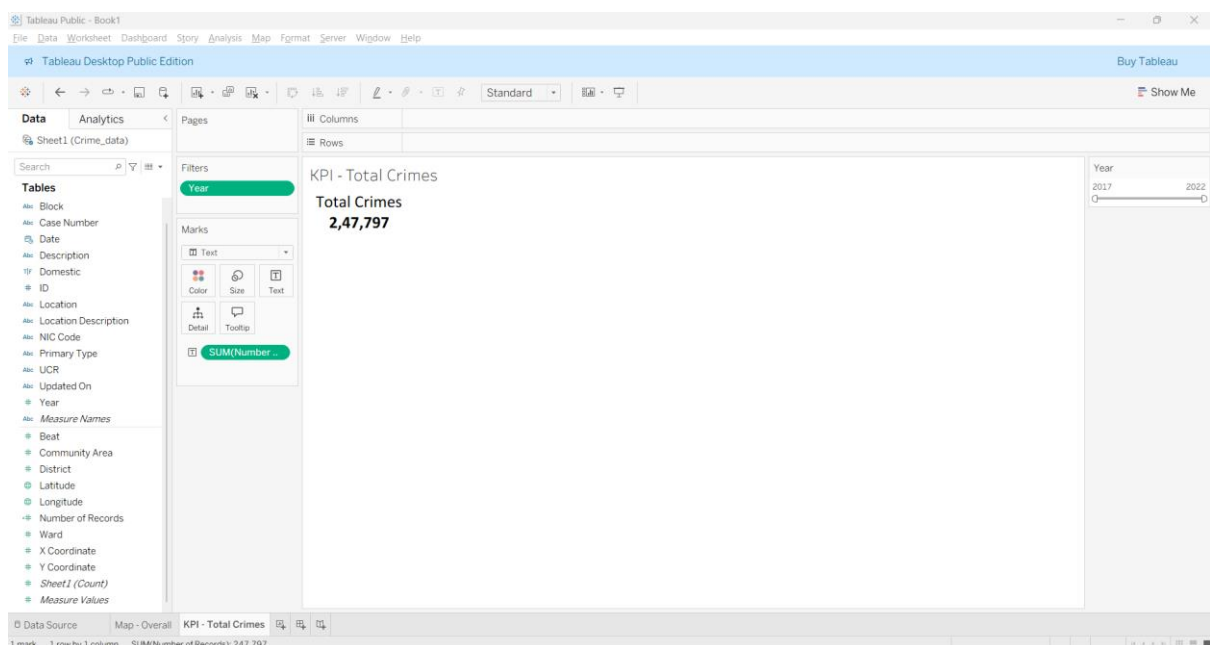
Created a new worksheet named “*KPI – Total Crimes*” to display the total number of crimes reported in the dataset. The “Number of Records” field was used to calculate the total count of incidents.

Supporting Work:

- Used the **SUM(Number of Records)** measure to display the total number of crime incidents.
- Changed the mark type to **Text** for a clear KPI-style number display.
- Formatted the text size and alignment to ensure visibility and dashboard consistency.
- Added a **Year filter** to allow dynamic updates when the user selects a specific year on the dashboard.

Value:

This KPI provides a quick, at-a-glance understanding of the total number of crimes reported in the dataset or for the selected period. It serves as the headline metric for assessing the overall crime volume in the city.



Step 3: Create KPI 2 – Arrest Rate (%)

Action:

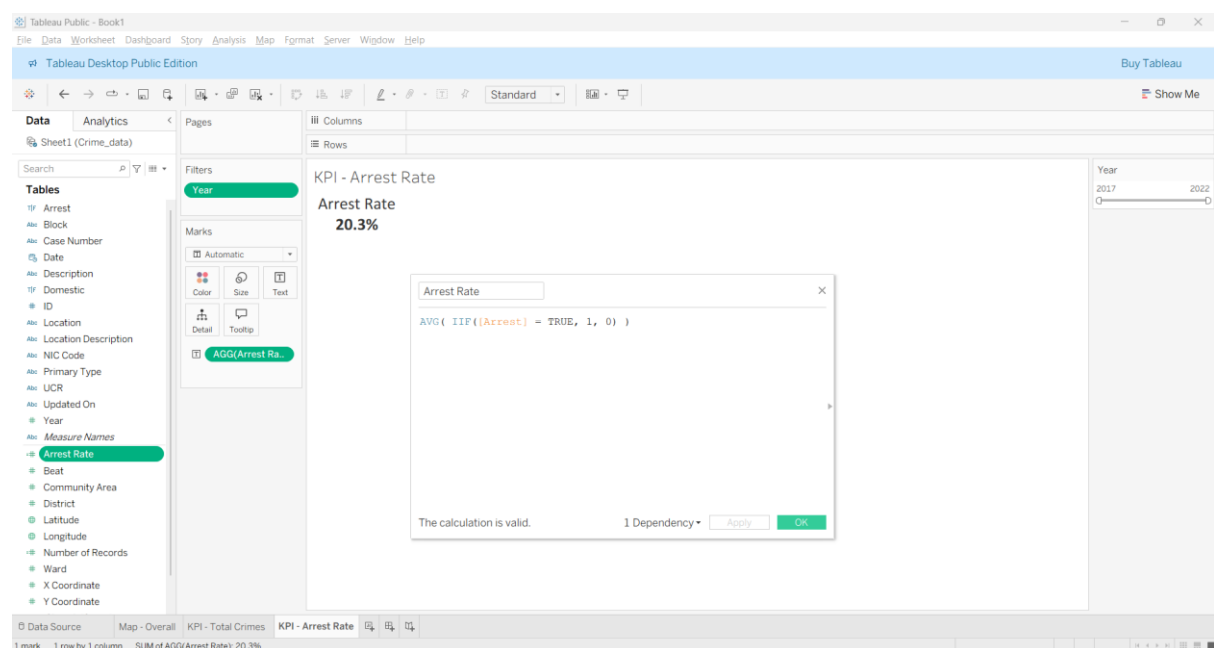
Developed a new worksheet titled “*KPI – Arrest Rate*” to calculate and display the percentage of crime cases resulting in arrests.

Supporting Work:

- Created a calculated field Arrest Rate = $\text{AVG}(\text{IIF}([\text{Arrest}] = \text{TRUE}, 1, 0))$ to compute the average of arrest instances.
- Changed the mark type to **Text** and formatted the output as a **percentage** for clarity.
- Adjusted font style and alignment to ensure consistency with other KPI cards.
- Added the **Year filter** to enable dynamic filtering by period.

Value:

This KPI helps measure the **efficiency of law enforcement** by showing the proportion of reported crimes that resulted in arrests. It provides immediate insight into operational effectiveness and crime resolution trends.



Step 4: Create KPI 3 – Domestic Crime Rate (%)

Action:

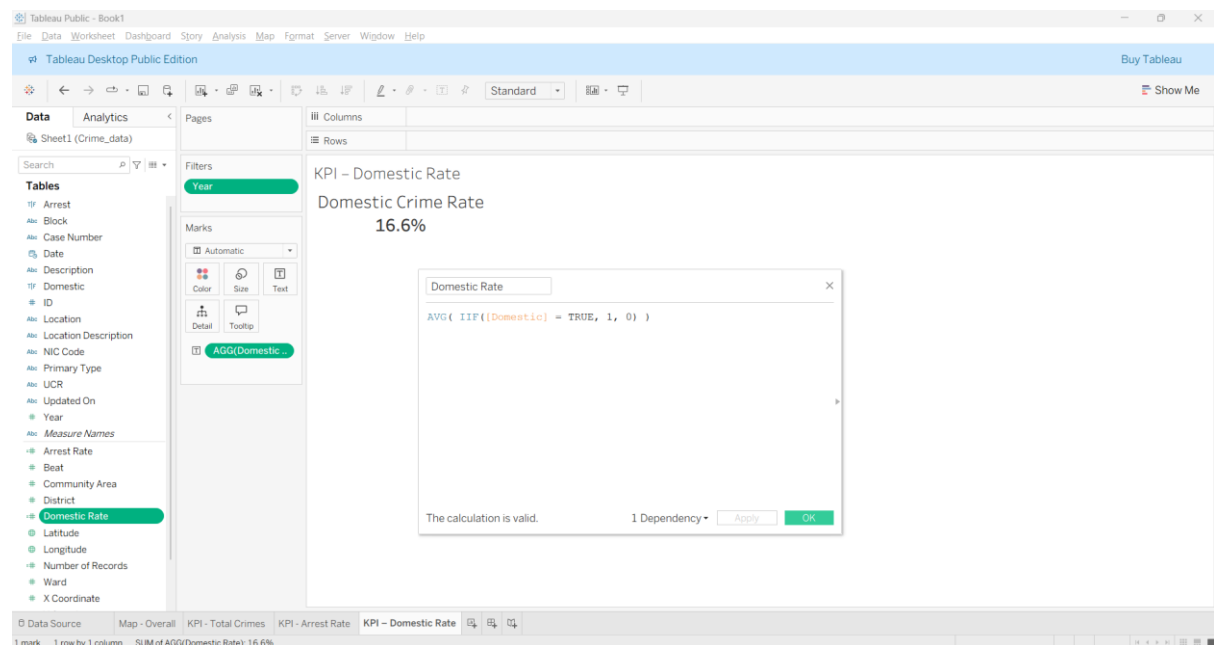
Built a new worksheet named “*KPI – Domestic Rate*” to measure the percentage of crime incidents classified as domestic cases.

Supporting Work:

- Created a calculated field Domestic Rate = $\text{AVG}(\text{IIF}([\text{Domestic}] = \text{TRUE}, 1, 0))$ to calculate the share of domestic crimes.
- Converted the output to a percentage format for easy interpretation.
- Formatted the view as a clean text KPI card with center-aligned labels and consistent styling.
- Added a *Year* filter to enable dynamic updates in the dashboard.

Value:

This KPI highlights the proportion of reported crimes that were domestic in nature, offering insight into trends related to domestic violence and family-related incidents. It helps authorities focus resources on sensitive crime categories.



Step 5: Create KPI 4 – Total Arrests

Action:

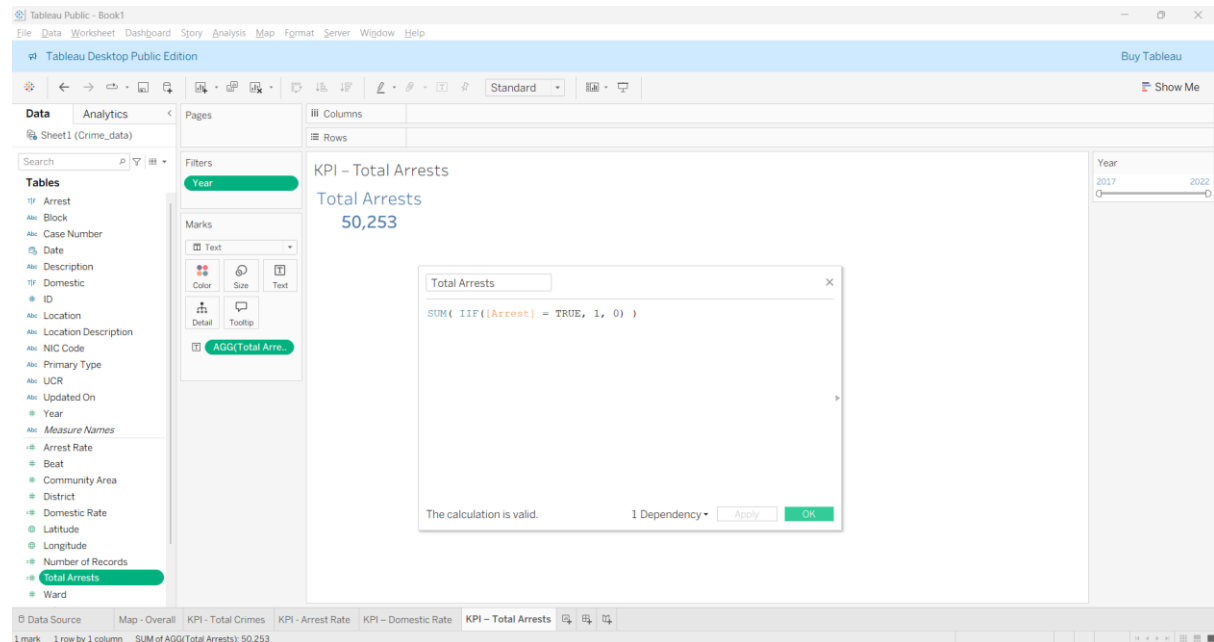
Developed a worksheet titled “*KPI – Total Arrests*” to display the total number of cases where an arrest was made.

Supporting Work:

- Created a calculated field Total Arrests = SUM(IIF([Arrest] = TRUE, 1, 0)) to count the total number of arrests.
- Displayed the metric as a **text-based KPI card** for clarity and dashboard uniformity.
- Applied consistent font, alignment, and colour formatting.
- Added the *Year* filter for dynamic updates across all KPI sheets.

Value:

This KPI highlights the **absolute number of successful arrests** within the dataset or selected period, complementing the Arrest Rate metric and providing tangible context to law-enforcement effectiveness.



Step 6: Create Bar Chart – Top Crime Types

Action:

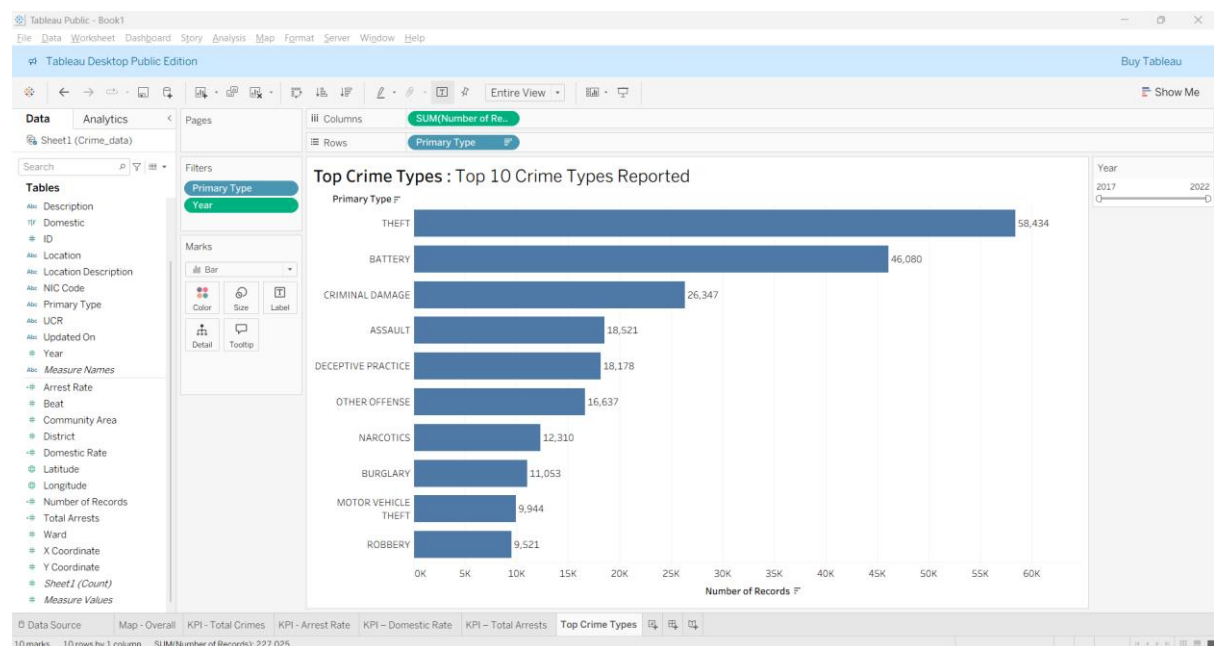
Created a bar chart titled “*Top Crime Types*” to visualize the most frequently reported crime categories based on total incidents.

Supporting Work:

- Used Primary Type on the Rows shelf and Number of Records on the Columns shelf to represent crime frequency.
- Applied a **Top 10 filter** to display only the highest occurring crime categories.
- Added **labels** and formatted the chart for clarity and visual appeal.
- Included a **Year filter** to allow users to view how crime rankings change over time.

Value:

This visualization provides a quick overview of the dominant crime types in the city, enabling stakeholders to identify major areas of concern and prioritize resource allocation for the most common offenses.



Step 7: Create Line Chart – Crimes by Hour

Action:

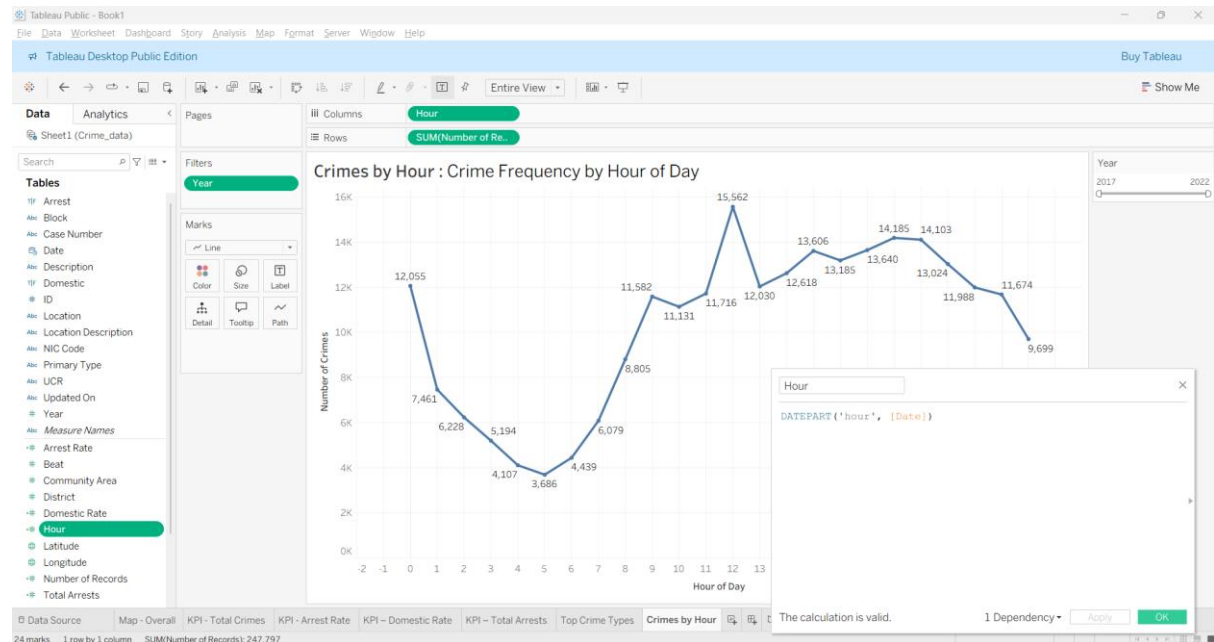
Developed a visualization titled “*Crimes by Hour*” to analyse how crime incidents vary throughout different hours of the day.

Supporting Work:

- Created a calculated field `Hour = DATEPART('hour', [Date])` to extract the hour from each record’s timestamp.
- Placed *Hour* on the Columns shelf and *Number of Records* on the Rows shelf.
- Displayed the trend as a **line chart** to emphasize hourly crime fluctuations.
- Added a **Year filter** for dynamic exploration.

Value:

This chart reveals temporal crime patterns, highlighting high-risk hours (typically late evening and night). Law enforcement can leverage these insights to plan patrol schedules and allocate resources more effectively.



Step 8: Create Bar Chart – Crimes by Day of Week

Action:

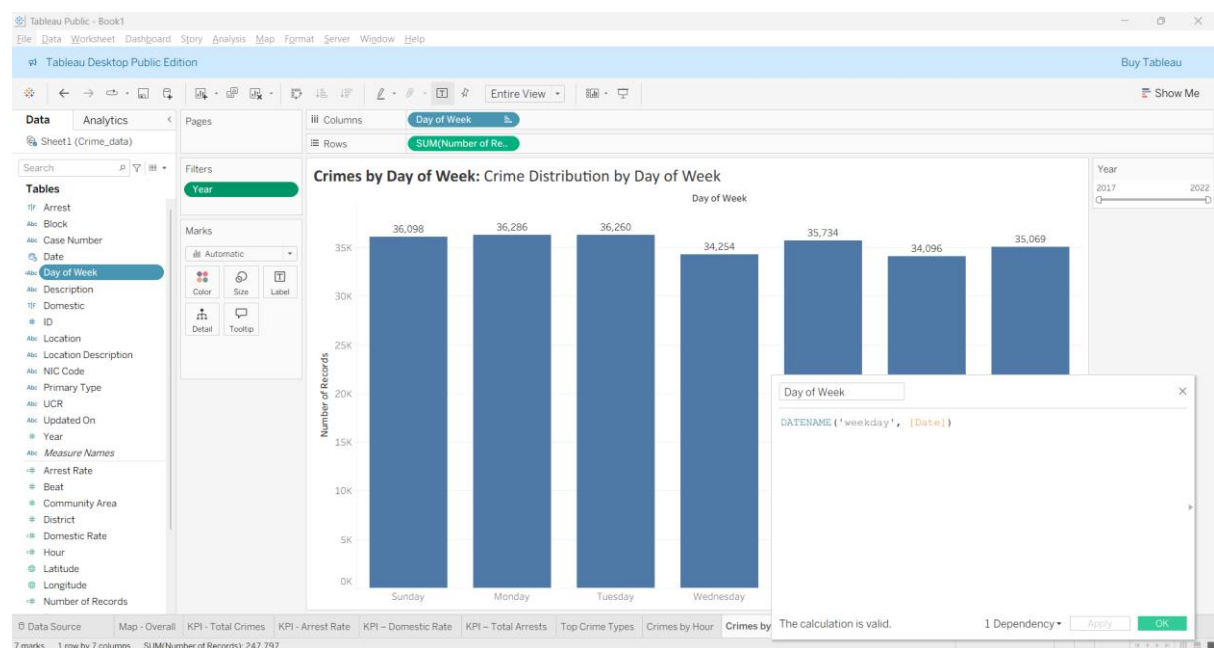
Developed a visualization titled “*Crimes by Day of Week*” to identify which days experience the most or least crime incidents.

Supporting Work:

- Created a calculated field `Day of Week = DATENAME('weekday', [Date])` to extract the weekday from each record.
- Placed *Day of Week* on Columns and *Number of Records* on Rows to form a bar chart.
- Added labels and formatted the chart for readability and consistency.
- Included a *Year filter* for dynamic analysis.

Value:

This visualization uncovers weekly crime trends, helping authorities identify high-risk days (e.g., weekends or weekdays) and plan preventive measures accordingly.



Step 9: Create Bar Chart – Crime by Time Block

Action:

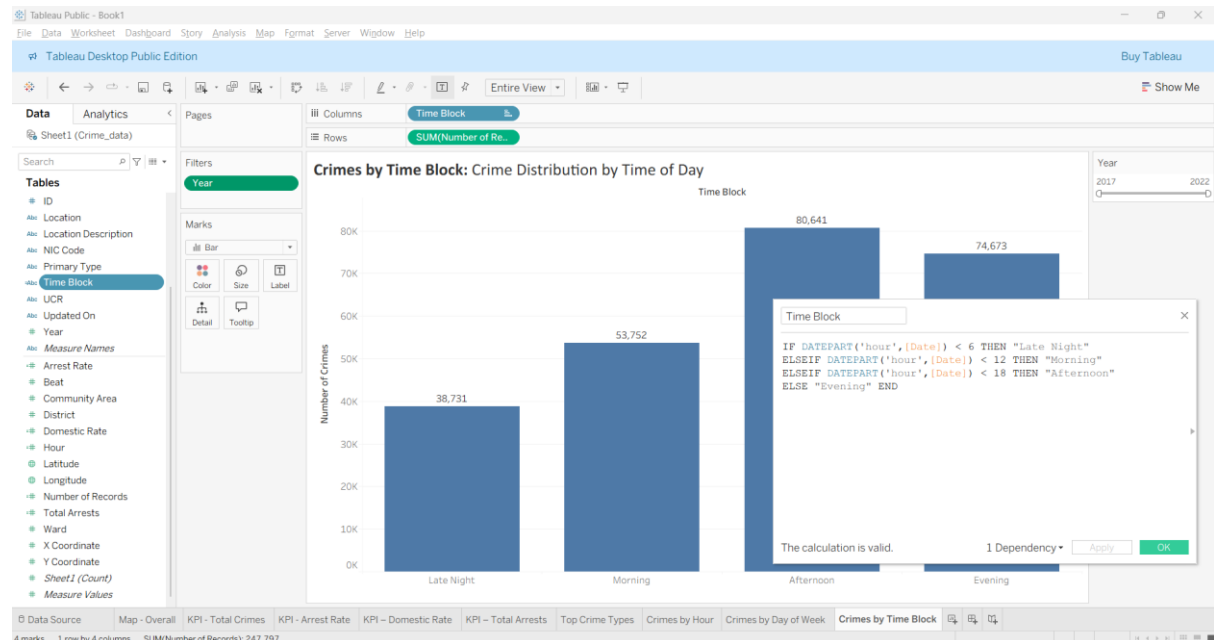
Developed a bar chart titled “*Crime by Time Block*” to analyze crime occurrences across four key time periods — Morning, Afternoon, Evening, and Late Night.

Supporting Work:

- Created a calculated field:
- Placed *Time Block* on Columns and *Number of Records* on Rows to create a summarized view of crime activity throughout the day.
- Manually sorted the time blocks in chronological order for easier interpretation.
- Added labels, formatted the chart, and included a *Year* filter for interactivity.

Value:

This chart helps identify the periods of the day with the highest crime activity. For example, if Evening and Late-Night show higher counts, it indicates when law enforcement should intensify patrolling and surveillance efforts.



Step 10: Create Line Chart – Yearly Crime Trend

Action:

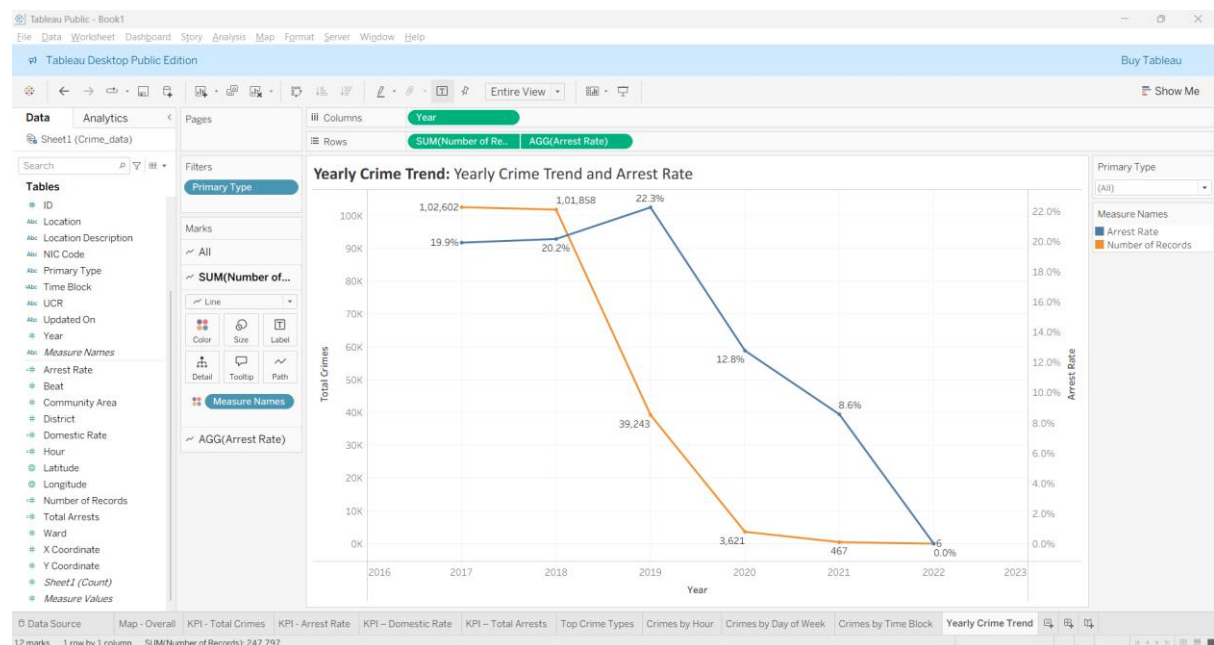
Created a line chart titled “*Yearly Crime Trend*” to visualize how the total number of crimes has changed over time, with an optional overlay of arrest rate percentages.

Supporting Work:

- Used Year on the Columns shelf and Number of Records on the Rows shelf to display yearly crime totals.
- Changed mark type to **Line** to emphasize trends over time.
- Added the Arrest Rate field to the secondary axis to create a **dual-axis chart** comparing crime volume and arrest efficiency.
- Applied consistent colour formatting and percentage formatting for the right axis.
- Added *Primary Type* as an optional filter to analyse trends by specific crime categories.

Value:

This visualization reveals long-term patterns in crime activity. By comparing total crimes and arrest rates, stakeholders can evaluate whether law enforcement effectiveness has improved or declined over the years.



Step 11: Create Pie Chart – Arrest vs Non-Arrest Analysis

Action:

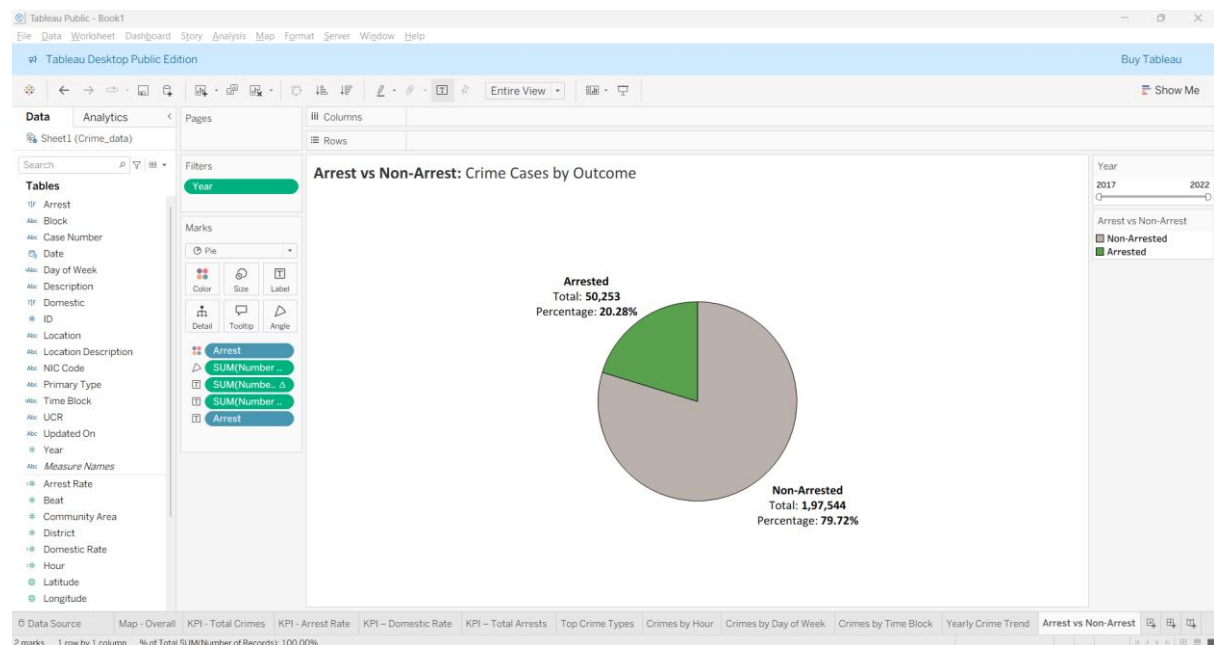
Created a visualization titled “*Arrest vs. Non-Arrest Analysis*” to represent the proportion of total crime cases that resulted in an arrest versus those that did not.

Supporting Work:

- Used the *Arrest* field as a dimension and *Number of Records* as a measure to create a comparative view.
- Represented the data using a **pie chart**, where slice size indicates crime proportion.
- Applied colour differentiation (e.g., Green for Arrest, Gray for Non-Arrest) and added labels showing both percentage and total counts.
- Added an optional *Year* filter for temporal analysis.

Value:

This visualization clearly communicates how many incidents lead to arrests, helping evaluate policing effectiveness and resource allocation. It complements the *Arrest Rate KPI* by showing absolute proportions in an intuitive way.



Step 12: Create Pie Chart – Domestic vs Non-Domestic Crime Analysis

Action:

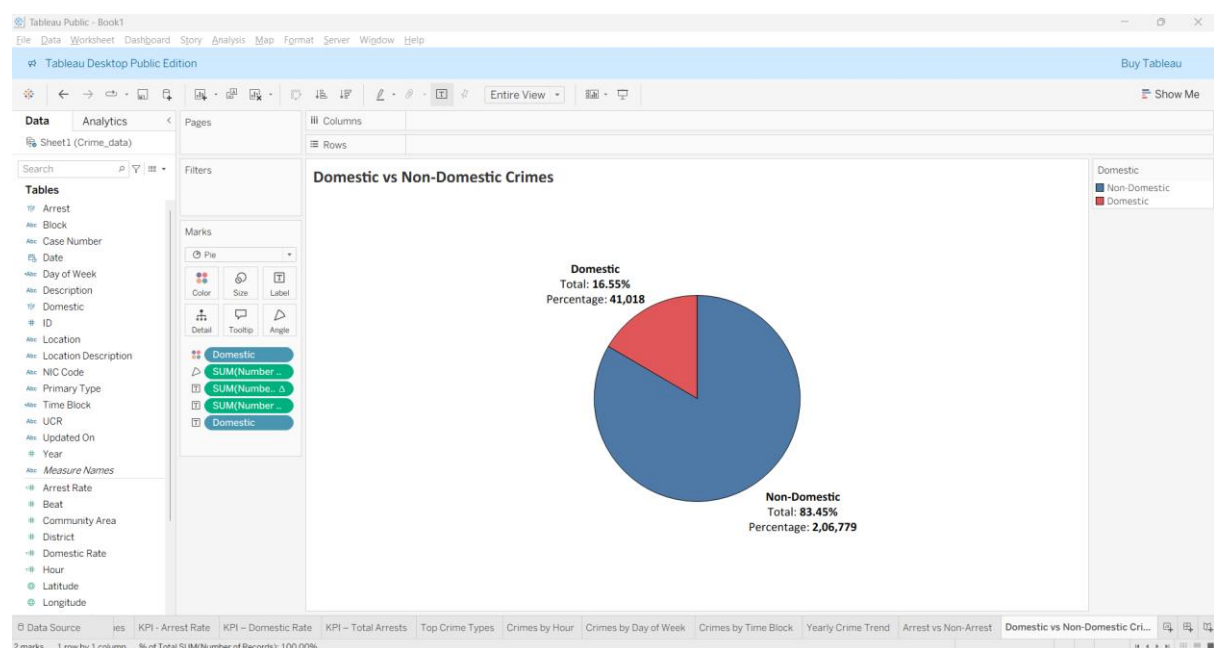
Created a visualization titled “**Domestic vs Non-Domestic Crimes**” to show the proportion of total reported crimes that occurred in domestic versus non-domestic settings.

Supporting Work:

- Used the **Domestic** field as a dimension and **Number of Records** as a measure to calculate total incidents.
- Represented the data using a **Pie Chart**, where slice size indicates the share of each category.
- Added dynamic **labels** showing:
 - Category (Domestic / Non-Domestic)
 - Total number of crimes and Percentage of total incidents
- Applied colour differentiation (**red for Domestic, blue for Non-Domestic**) and placed labels **outside the slices** for clarity.

Value:

This visualization provides insight into the share of domestic-related crimes compared to non-domestic ones, helping identify the prevalence of household or private-space crimes versus public offenses.



Step 7: Dashboard Design – Final Crime Analysis Dashboard

Action:

Created an interactive dashboard titled “**Chicago Crime Analysis Dashboard (2017–2022)**” combining key performance indicators, analytical charts, and a geographical crime map into a unified interface.

Supporting Work:

- Used a **floating horizontal container** at the top to display four KPI cards: *Total Crimes*, *Arrest Rate*, *Domestic Crime Rate*, and *Total Arrests*, with consistent background, borders, and a shared **Year filter**.
- Added **Three vertical containers** for the main analytical visuals:
 - *Left container* – Integrated **Crime Distribution by Day of Week** and **Time of Day** charts to highlight temporal crime patterns
 - *Middle container* – **Yearly Crime Trend** and **Top 5 Crime Types** for pattern and frequency analysis.
 - *Right container* – **Arrest vs Non-Arrest** and **Domestic vs Non-Domestic Crimes** pie charts for proportional comparison.
- Positioned the **Geographical Crime Map** on left above the left container to show spatial distribution.
- Applied a **global Year filter** that synchronizes across all sheets to allow dynamic interactivity.
- Maintained consistent formatting with uniform colours, font sizes, padding, and clean spacing across all containers.

Value:

The dashboard provides a comprehensive and interactive overview of crime data, enabling users to explore temporal, categorical, and geographical patterns in one place. It supports data-driven insights for understanding citywide crime trends and assisting in strategic decision-making.



3. Conclusion

In this project, a comprehensive **Crime Analysis Dashboard** was developed using **Tableau Desktop** to visualize and interpret crime patterns across Chicago between 2017 and 2022.

The process involved:

- Designing and implementing multiple **KPIs** to measure overall crime volume, arrest rates, and domestic crime ratios.
- Building **analytical charts** to explore temporal trends, crime types, and outcome distributions.
- Incorporating a **geographical map** to identify regional hotspots and spatial clustering of incidents.
- Combining all insights into an **interactive, user-friendly dashboard** with dynamic filters for deeper exploration.

The final dashboard provides actionable insights into how crimes vary by type, time, and location — enabling data-driven decision-making for law enforcement, policymakers, and analysts. It demonstrates proficiency in Tableau’s visualization features, dashboard design principles, and storytelling with data.

