



GREATER LONDON CRIMES ANALYSIS DASHBOARD

- Technical Report -

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01. INTRODUCTION

The Monthly Crime Datasets of the UK Metropolitan Police Service (MPS) are an important collection of precise information about recorded crimes in the Greater London area. These datasets cover a wide range of crime categories, geographic areas, timeframes, and other critical data points, and they serve as a vital resource for a variety of stakeholders, including law enforcement, legislators, researchers, and the general public. The MPS hopes to promote improved understanding, analysis, and collaboration in addressing criminal activities by providing transparent access to frequently updated crime information. These statistics are critical in identifying trends, emphasizing crime patterns, and encouraging evidence-based solutions to improve community safety and develop more effective crime prevention methods.

This report outlines the design, development, and testing of a SQL database and Power BI Dashboard for the Monthly Crimes in the Greater London areas.

The report explains how to import data from Microsoft SQL Server into Power BI as well as create a Power BI dashboard. Also, includes suggestions for designs and recommendations, SQL statements with pertinent comments, and a full backup of the database and dashboard contents. This document lays out all of the steps necessary to develop a dashboard in a clear and logical manner.

The dashboard is designed to assist clients in comprehending monthly data on UK crimes. The data is summarized and viewed using several sorts of charts to spot changes that occur during each month.

02. EXPLORATION OF DATA

The MPS Monthly Crime Datasets cover a wide range of crime types, including theft, assault, burglary, and drug-related offenses, and provide detailed information on crime occurrences, locations, dates, and outcomes. This comprehensive dataset enables detailed investigation, allowing for the analysis of trends, temporal patterns, and the spatial distribution of criminal activity across Greater London.

Crimes committed in London metropolitan police areas are included in MPS Crime statistics. The Metropolitan Police area includes all 32 London boroughs but excludes the City of London proper (the primary financial area), which is policed by a distinct agency, the City of London Police.

More data about the Metropolitan Police can be obtained using this link below : <https://www.met.police.uk/>

2.1. Downloading the Dataset

For the purpose of reviewing, the required data sets can be downloaded from the official London Datastore website by using the below link : <https://data.london.gov.uk/dataset/mps-monthlycrime-dahboard-data>

The downloaded data should be saved in a convenient location in your PC (Personal Computer).

2.2. Reviewing the data

The Monthly Crime Datasets of the UK Metropolitan Police Service (MPS) includes all the sorts of crimes that occur in the UK. The dataset's columns appear to capture various aspects of crime statistics within a specific jurisdiction or region. These details are represented under the following columns which are also briefly described below.

- **Month_Year** : This column most likely contains information on the month in which a specific crime occurred. In Excel, it may first appear in text or date format. It can be stored in SQL as a DATE, DATETIME, or INTEGER denoting months.
- **Area Type** : This column most often classifies the geographical divisions or sorts of areas within a region (for example, boroughs and districts). It may appear as text or categorical data in Excel. In SQL, it might be saved as VARCHAR.
- **Borough_SNT** : This column most likely refers to the Safer Neighbourhood Team of the Borough, suggesting distinct policing units inside boroughs. A string or categorical data set

could be used as the data type. It most likely comprises text data and is stored in SQL as VARCHAR or TEXT.

- **Area Name :** This column includes the names of certain jurisdictional areas or regions. The data type is almost certainly a string. It's most likely text data, which might be put in SQL as VARCHAR.
- **Area Code :** This column contains unique identifiers or codes issued to various areas within the region. It could be alphanumeric and recorded as VARCHAR or CHAR in SQL.
- **Crime Type :** This column most likely represents the principal category of reported crime occurrences (for example, theft, assault). The data type used is string data. Hence, it is typically text data and can be saved in SQL as VARCHAR.
- **Crime Subtype :** This column contains additional precise information or subcategories within each crime type (for example, different sorts of stealing or assault). The data type used is most likely string data and this shall also be stored as VARCHAR in SQL.
- **Measure :** The aim of this column is not explained directly. It could include more context regarding the crime data or the measuring unit used to produce specific numbers. A string data set is used as the data type. Therefore, in SQL it shall be stored as VARCHAR.
- **Financial Year :** This column most likely denotes the fiscal year in which the crime data was collected. It may appear in text or date format in Excel. In SQL, the year could be stored as a DATE, DATETIME, or INTEGER.
- **Count :** This column most usually contains numerical figures that represent the number of reported crimes or incidents corresponding to the specified attributes (Crime Type, Area, etc). Numeric (integer or float) data would be used here. Hence, In SQL, it should be stored as an INTEGER or DECIMAL.

These descriptions above provide an overview of each column's potential content and its associated data types as understanding the contents and data types of these columns is critical for correct analysis and interpretation of the crime information.

2.3. Data Cleaning

In order to identify any outliers or missing values (null values) and rectify or document these issues using MS Excel we must ensure that the dataset is well-understood in terms of variables and data types.

Therefore, the downloaded data set should be opened in MS Excel, and a new column should be derived as “**OUTLIERS**”.

- **Outliers** : This column is not a part of the original data set since it is derived during the data analysis. In Excel, this column shall be represented as a Boolean Value (TRUE or FALSE) which helps to sort and filter the outliers and null values from the dataset. This helps to indicate whether a particular record is considered an outlier based on pre-defined criteria.

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POSSIBLE DATA LOSS Some features might be lost if you save this workbook in the comma-delimited (.csv) format. To preserve these features, save it in an Excel file format.

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outliers

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
1	Month_Ye	Area Type	Borough	Area Name	Area Code	Crime Type	Crime Sub Measure	Financial Y Count			outliers												
2	1/1/2015	Borough	Aviation St	Aviation St	SO18	Domestic	Domestic Statistics	fy14-15	2		FALSE												
3	1/1/2015	Borough	Aviation St	Aviation St	SO18	Hate crime	Faith Crim Offences	fy14-15	2		FALSE												
4	1/1/2015	Borough	Aviation St	Aviation St	SO18	Hate crime	Faith Crim Outcomes	fy14-15	1		FALSE												
5	1/1/2015	Borough	Aviation St	Aviation St	SO18	Hate crime	Hate Crim Offences	fy14-15	2		FALSE												
6	1/1/2015	Borough	Aviation St	Aviation St	SO18	Hate crime	Hate Crim Outcomes	fy14-15	1		FALSE												
7	1/1/2015	Borough	Aviation St	Aviation St	SO18	Hate crime	Islamoph Offences	fy14-15	2		FALSE												
8	1/1/2015	Borough	Aviation St	Aviation St	SO18	Hate crime	Islamoph Outcomes	fy14-15	1		FALSE												
9	1/1/2015	Borough	Aviation St	Aviation St	SO18	Hate crime	Racist and Offences	fy14-15	2		FALSE												
10	1/1/2015	Borough	Aviation St	Aviation St	SO18	Hate crime	Racist and Outcomes	fy14-15	1		FALSE												
11	1/1/2015	Borough	Aviation St	Aviation St	SO18	Miscallene	Theft Pers Offences	fy14-15	3		FALSE												
12	1/1/2015	Borough	Barking & Barking & IG	Barking & Barking & IG	IG	Gun crime	Gun Crime Offences	fy14-15	2		FALSE												
13	1/1/2015	Borough	Barking & Barking & IG	Barking & Barking & IG	IG	Gun crime	Personal R Offences	fy14-15	1		FALSE												
14	1/1/2015	Borough	Barking & Barking & IG	Barking & Barking & IG	IG	Hate crime	Hate Crim Outcomes	fy14-15	7		FALSE												
15	1/1/2015	Borough	Barking & Barking & IG	Barking & Barking & IG	IG	Hate crime	Racist Crim Outcomes	fy14-15	7		FALSE												
16	1/1/2015	Borough	Barking & Barking & IG	Barking & Barking & IG	IG	Hate crime	Racist and Outcomes	fy14-15	7		FALSE												
17	1/1/2015	Borough	Barking & Barking & IG	Barking & Barking & IG	IG	Knife crim	Knife Injur Offences	fy14-15	6		FALSE												
18	1/1/2015	Borough	Barking & Barking & IG	Barking & Barking & IG	IG	Knife crim	Knife Injur Offences	fy14-15	2		FALSE												
19	1/1/2015	Borough	Barking & Barking & IG	Barking & Barking & IG	IG	Knife crim	Knife Injur Offences	fy14-15	6		FALSE												
20	1/1/2015	Borough	Barking & Barking & IG	Barking & Barking & IG	IG	Knife crim	Knife crim Outcomes	fy14-15	10		FALSE												
21	1/1/2015	Borough	Barking & Barking & IG	Barking & Barking & IG	IG	Knife crim	Knife crim Outcomes	fy14-15	10		FALSE												
22	1/1/2015	Borough	Barking & Barking & IG	Barking & Barking & IG	IG	Knife crim	Knife crim Outcomes	fy14-15	2		FALSE												
23	1/1/2015	Borough	Barking & Barking & IG	Barking & Barking & IG	IG	Miscallene	Dog Attaci Offences	fy14-15	4		FALSE												
24	1/1/2015	Borough	Barking & Barking & IG	Barking & Barking & IG	IG	Miscallene	Robbery r Outcomes	fy14-15	5		FALSE												
25	1/1/2015	Borough	Barnet	Barnet	SX	Gun crime	Gun Crime Offences	fy14-15	1		FALSE												
26	1/1/2015	Borough	Barnet	Barnet	SX	Gun crime	Gun Crime Outcomes	fy14-15	4		FALSE												

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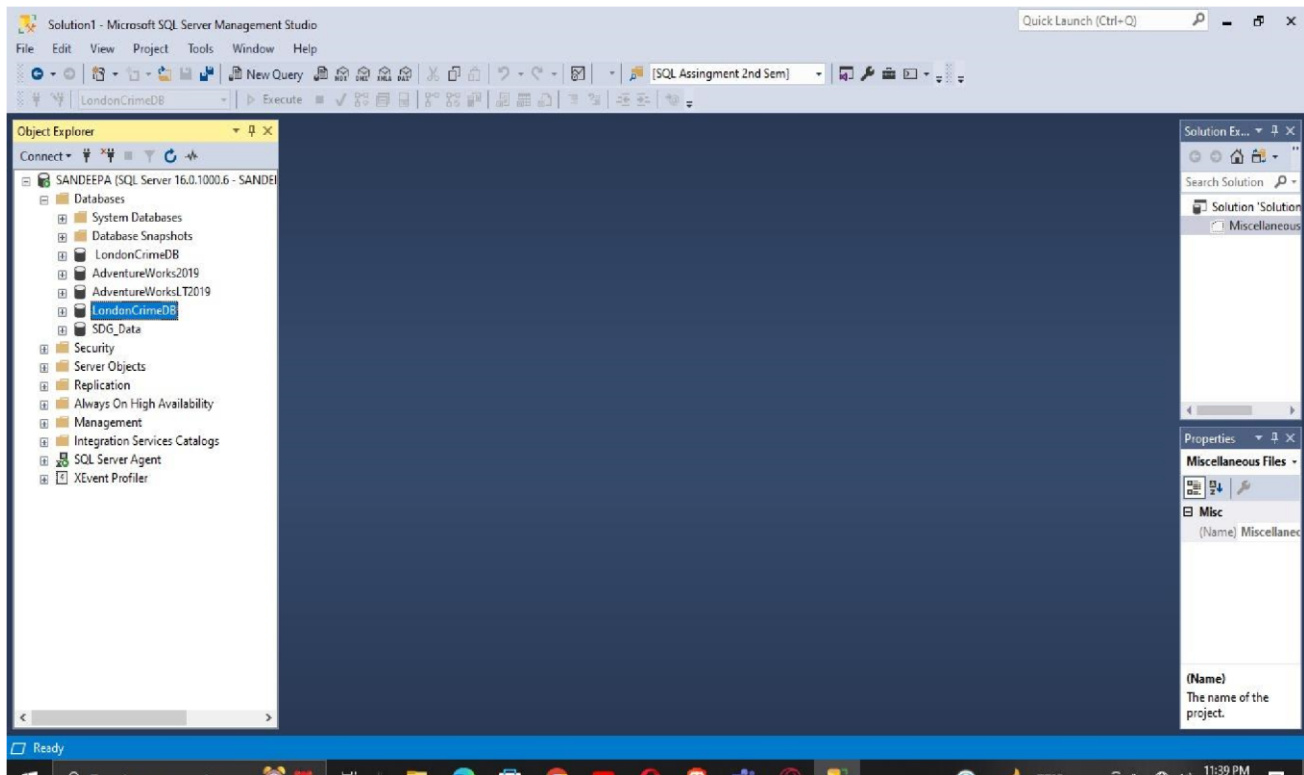
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2.4. Importing Data from Microsoft Excel to a Microsoft SQL Server Management Studio (SSMS)

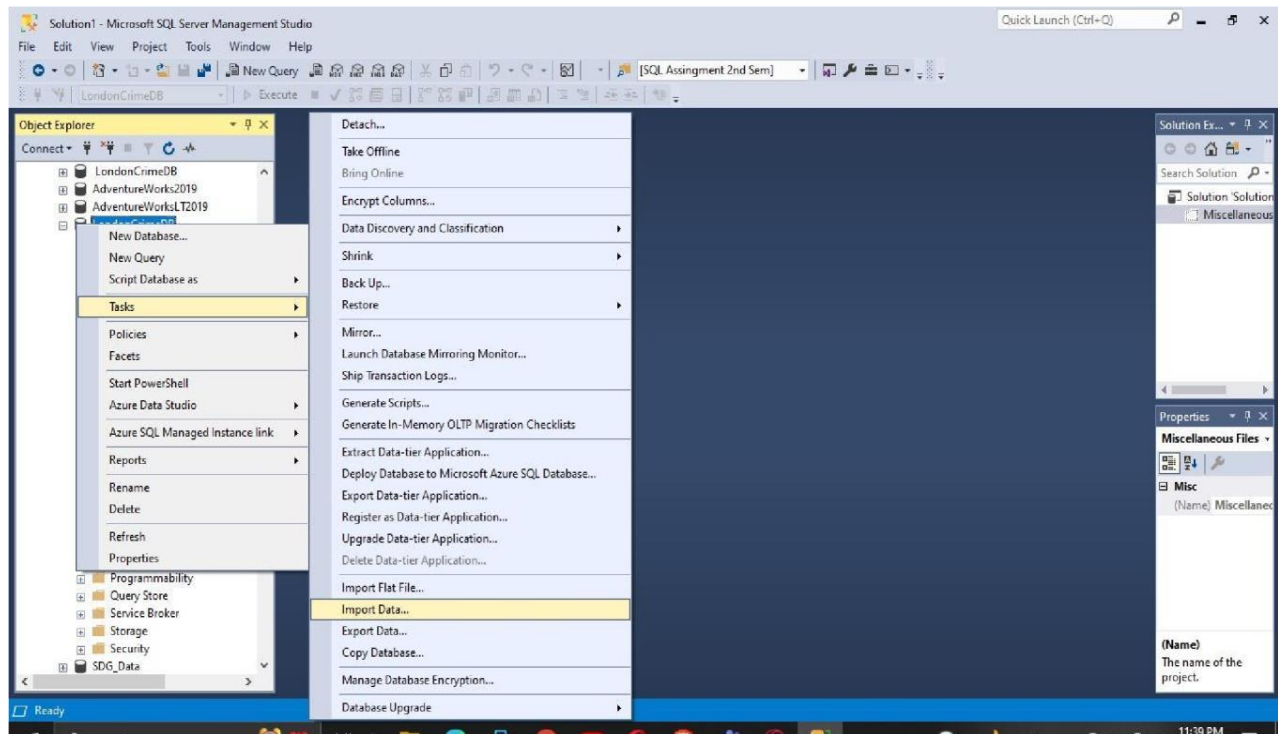
Importing data from MS Excel to MS SSMS simplifies data management, enhances data integrity, enhances data analysis capabilities, and enables better system integration, which are essential when dealing with large volumes of data.

Accordingly, the data set is being imported from MS Excel to Microsoft SQL Server Management Studio as follows :

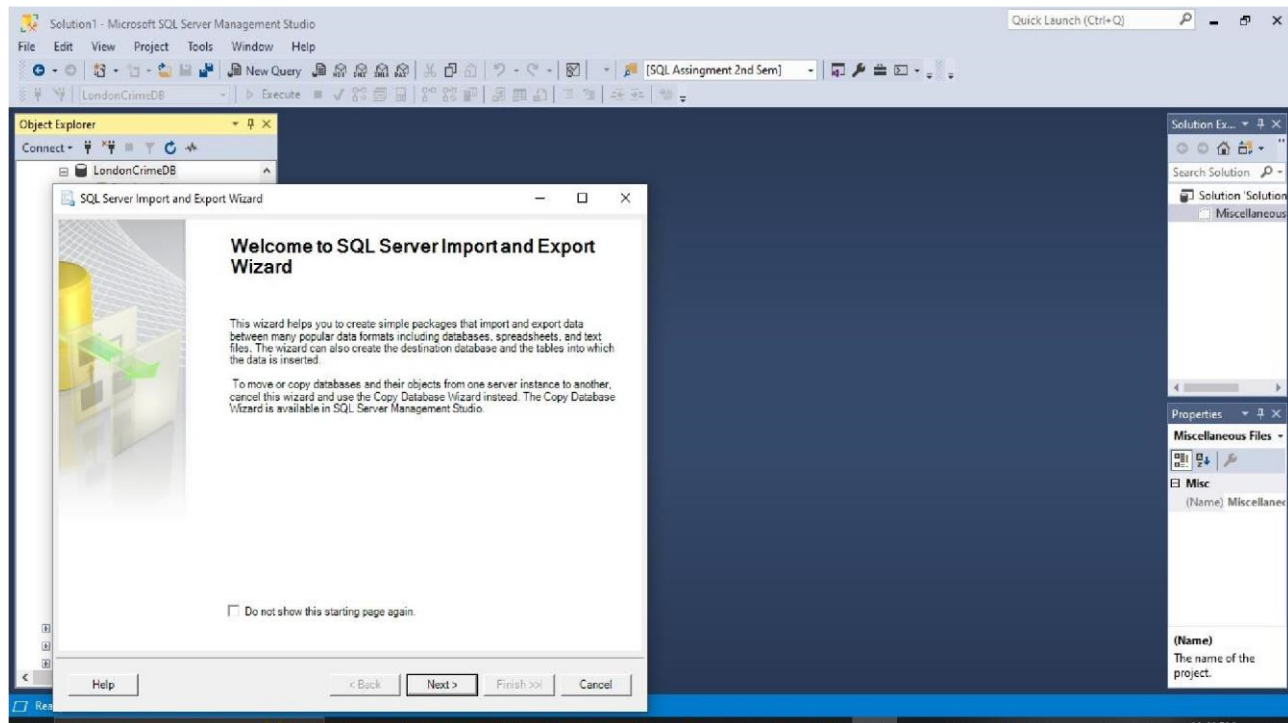
- First, Open SSMS and connect to the SQL Server Instance.
- Create a database called **“LondonCrimeDB”**.
- The created new database shall be displayed in the Object Explorer Server Tree under the Database folder



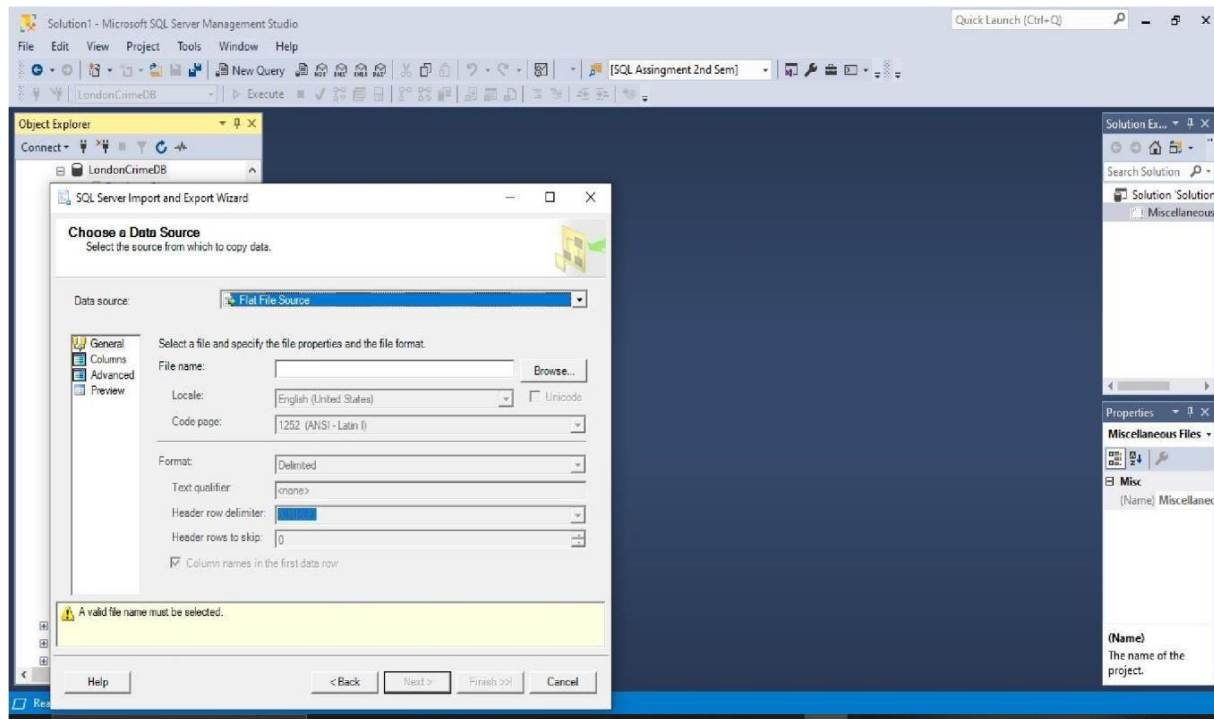
- Next, Expand the Object Explorer Server Tree and expand the Database folder
- Right-click on **“LondonCrimeDB”** Database
- Now, select the **“Tasks”** button
- Next, click on the button **“Import Data”**



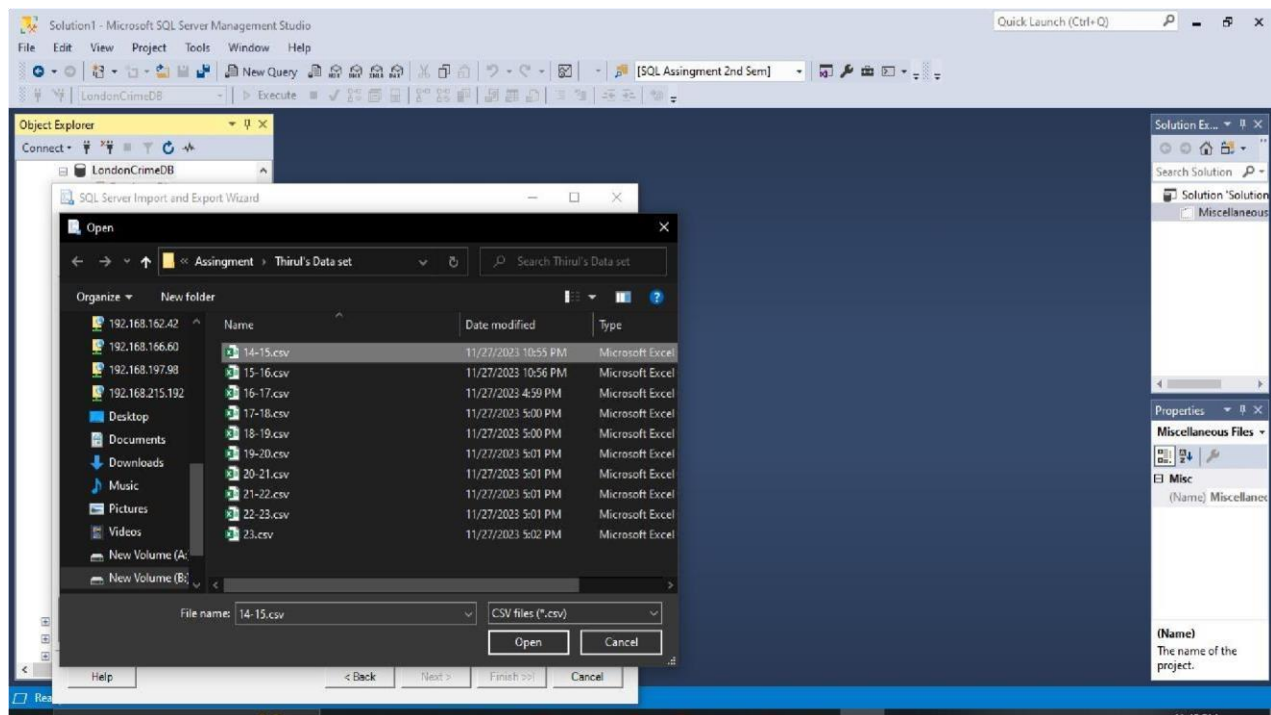
→ Click on the “Next” button on the Import and Export Wizard welcome page that appears on the screen.



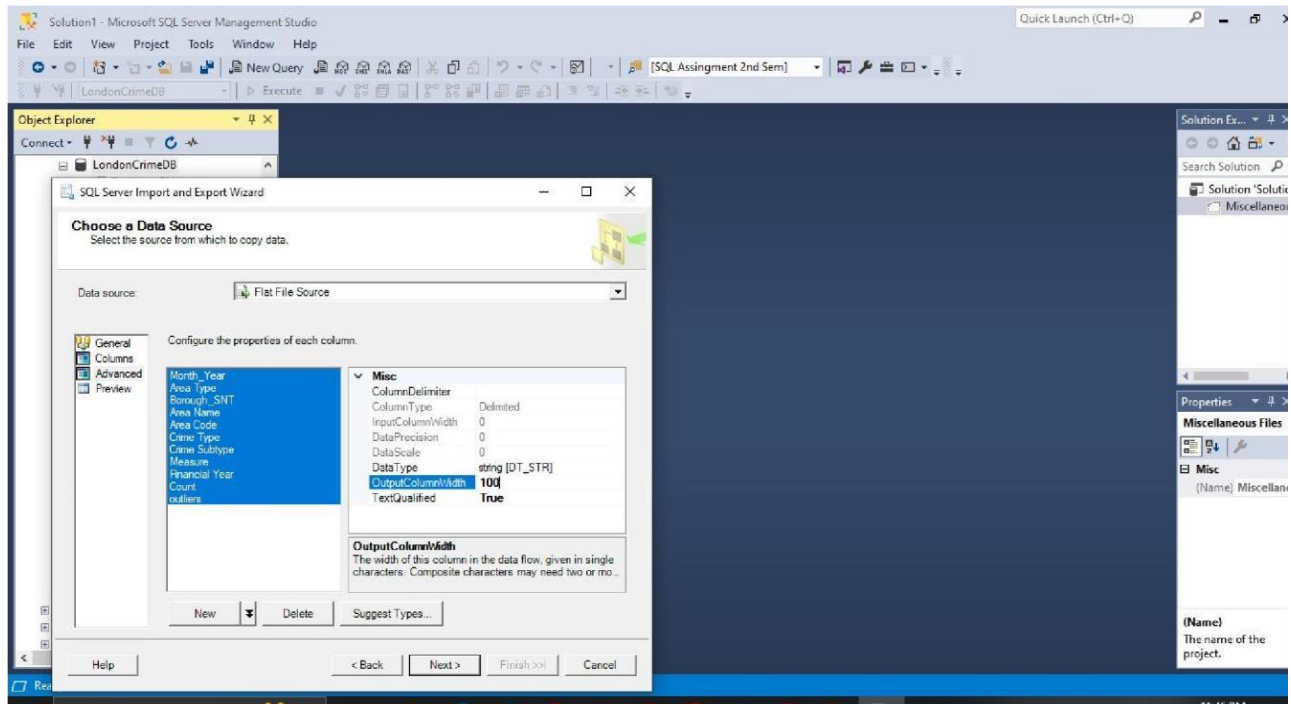
→ Select “Flat File Source” as the data source.



→ Enter the file or browse for the file.

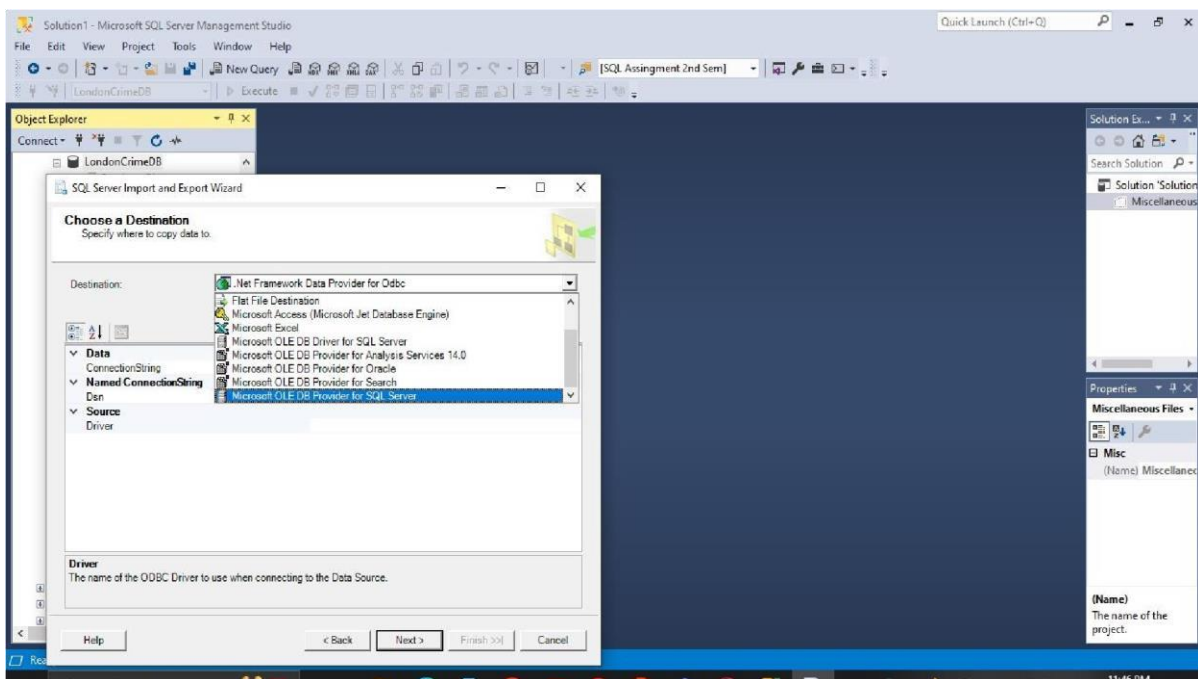


→ Then, go to “Advanced” SQL tab and change all the column widths from 50 to 100.

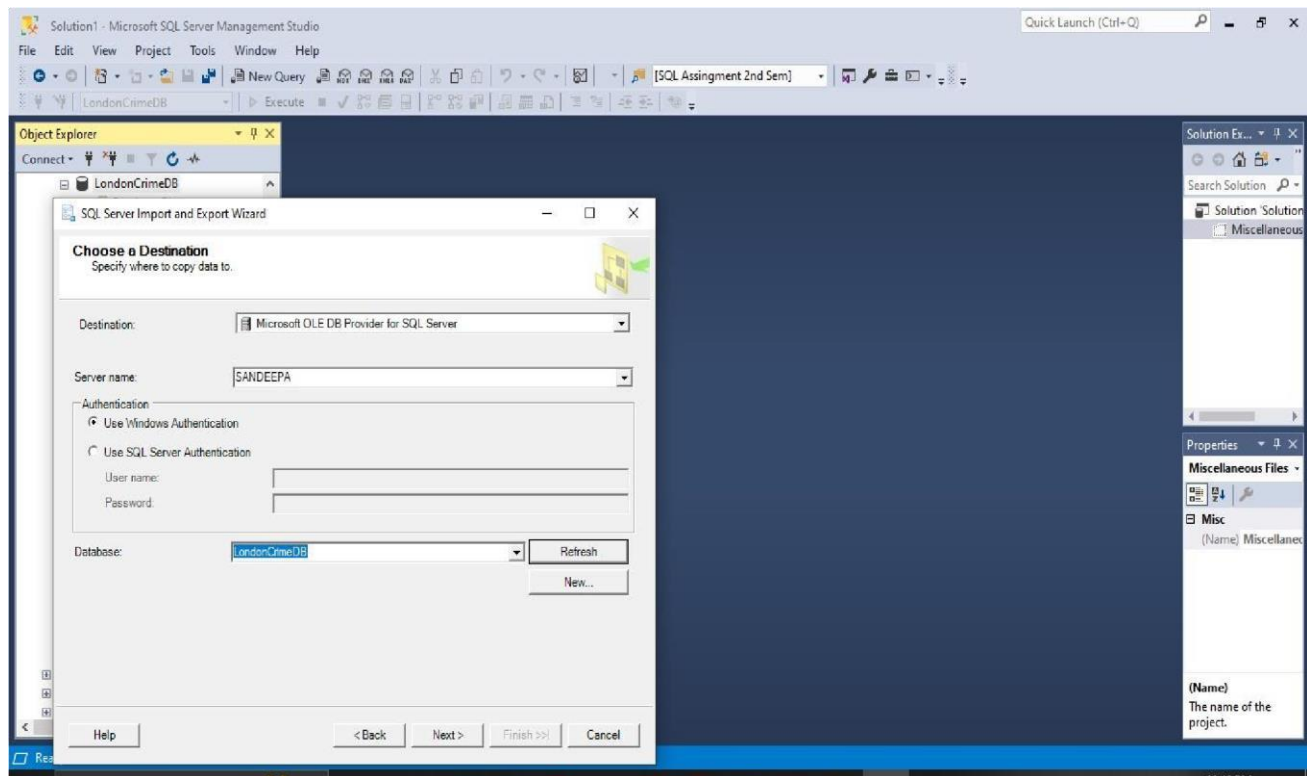


→ After adjusting the column widths, click on “Next” to move forward

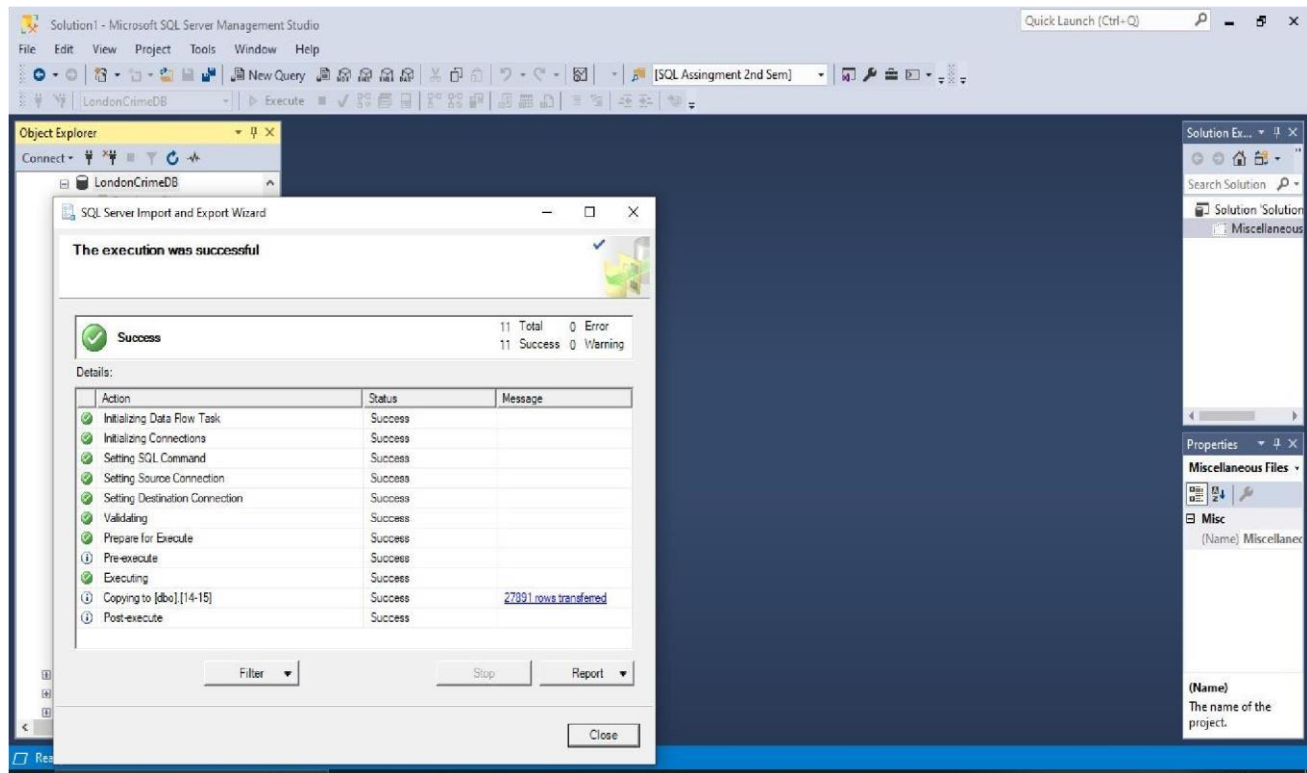
→ Choose “Microsoft OLE DB Provider for SQL Server” as the destination.



- Select the destination and click on the “Refresh” button and then click on the “Next” button.



- Click “Next” and accept the default on the “Save and Run Package” dialog box that appears on the screen.
- Then, click the “Next” button on the “Select Source Tables and Views” dialog box as well to move forward.
- When the “Complete the Wizard” dialog box appears, click on the “Finish” button.
- Then, the execution dialogue box appears, if all the data has loaded successfully, click the “Close” button.



→ Now, the new table shall appear under the database “LondonCrimeDB” in the the Object Explorer Server Tree.

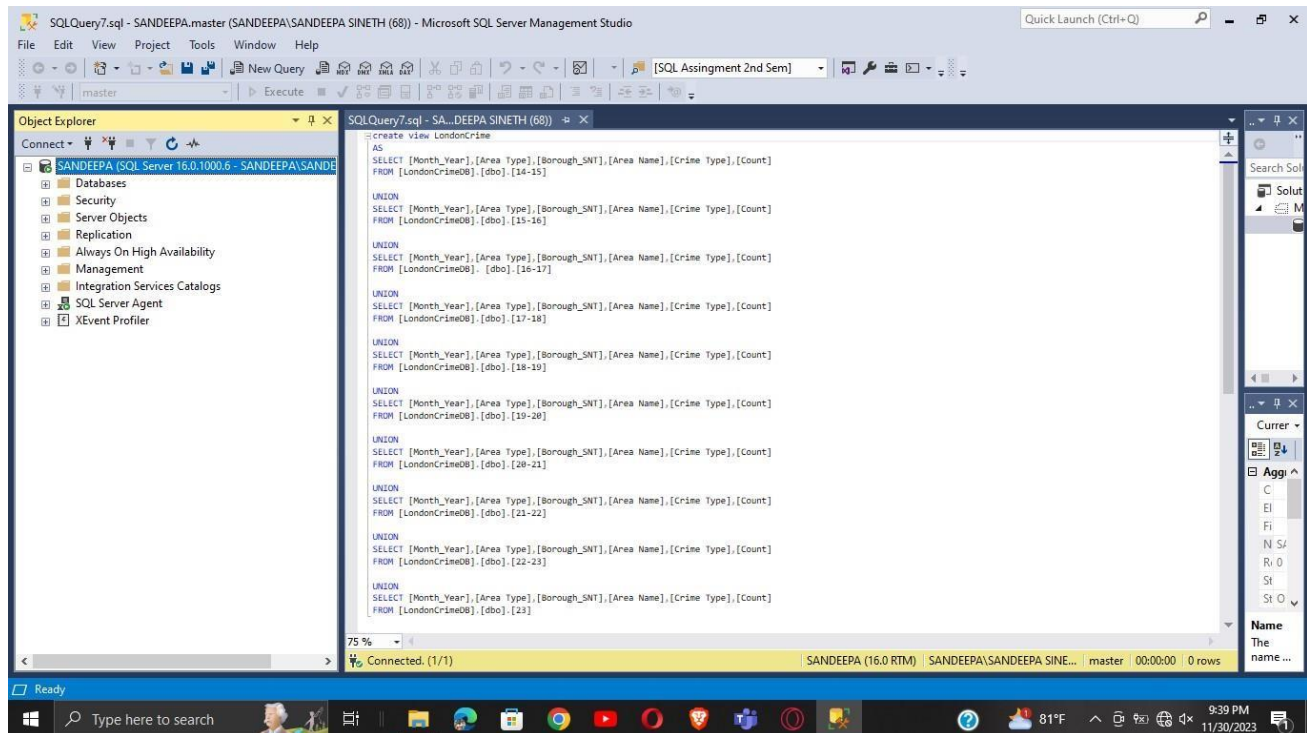
→ Repeat the same steps to add the CSV files of the data set.

2.5. Creating a View

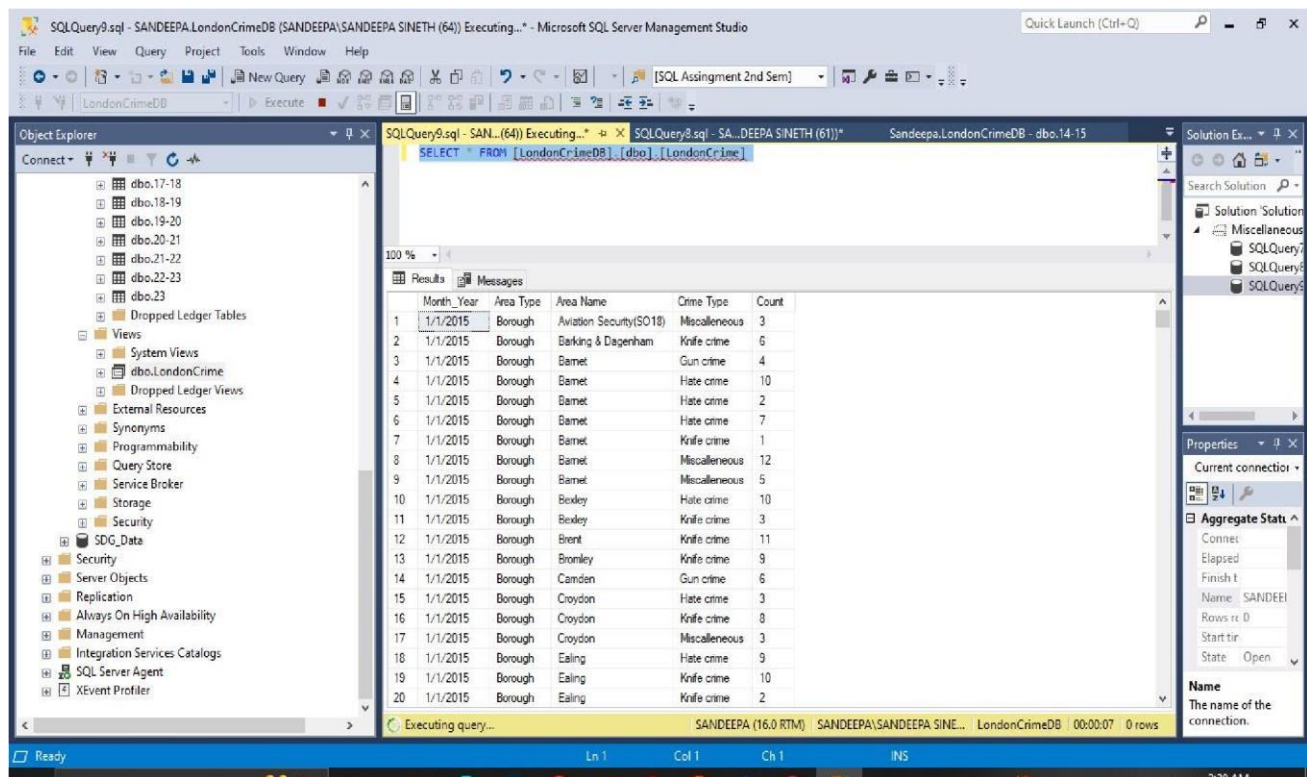
Creating a view entail creating a virtual table in SQL that provides a customized view of specific columns or rows for the existing datasets of the Monthly Crime Datasets of the UK Metropolitan Police Service (MPS) without changing the original data. It provides a flexible and usable method for simplifying complex searches, improving data security, and streamlining access by consolidating important data for efficient analysis.

By creating a view, we can eliminate a few columns and retrieve the inconsistent data.

The following code should be entered in a new query in order to create a view by associating all the tables.



Once it is executed, it shall be displayed as follows.



03. DASHBOARD DESIGN AND IMPLEMENTATION

The dashboard for the UK Metropolitan Police Service's Monthly Crime Datasets should be userfriendly, featuring graphs, maps, and charts displaying essential crime statistics, allowing users to filter data by crime type, location, time period, and demographics. It should include interactive elements, drill-down capabilities, and real-time updates for a dynamic interface. Color-coded visualizations, trend analysis tools, and comparative displays aid in the communication of complicated data.

The dashboard should be optimized for various devices and browsers for better usability and accessibility. Therefore, the Power BI Software is used to create the dashboard for the dataset.

Power BI helps to create a dashboard for the UK Metropolitan Police Service (MPS) Monthly Crime Datasets, enabling effective visualization and analysis of crime-related information. The dashboard showcases diverse crime types, geographical distribution, trends, and comparative analyses, with the combination of filters, slicers, and dynamic features ensuring user-friendly navigation and customized views, empowering law enforcement, legislators, and the general public to get actionable insights, detect patterns, and make data-driven decisions for crime prevention and resource allocation.

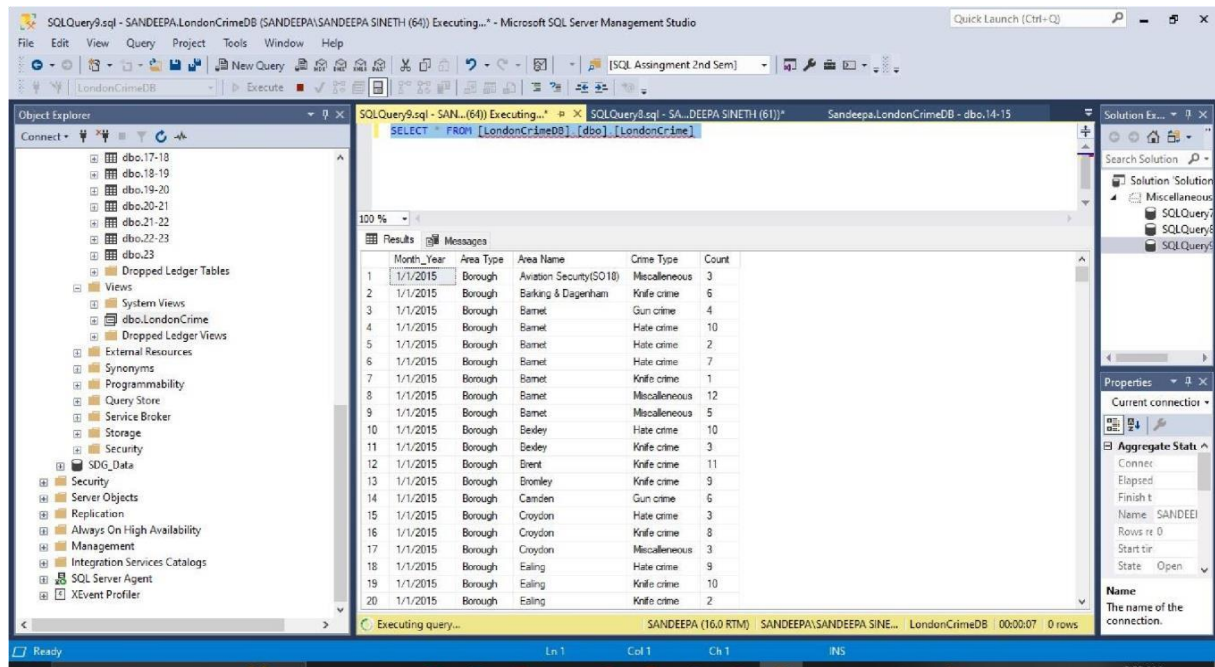
Furthermore, incorporating real-time updates or periodic refreshes ensures that the dashboard remains current and relevant for continuing analysis and strategic planning.

3.1. Importing Data from the SQL Server Management Studio to Microsoft Power BI

Importing data from MS SSMS to MS Power BI allows improved and smooth data transfer for analysis and visualization. This interface enables users to import data straight from SSMS databases into Power BI, where they can use its extensive functionality to generate informative visualizations and reports.

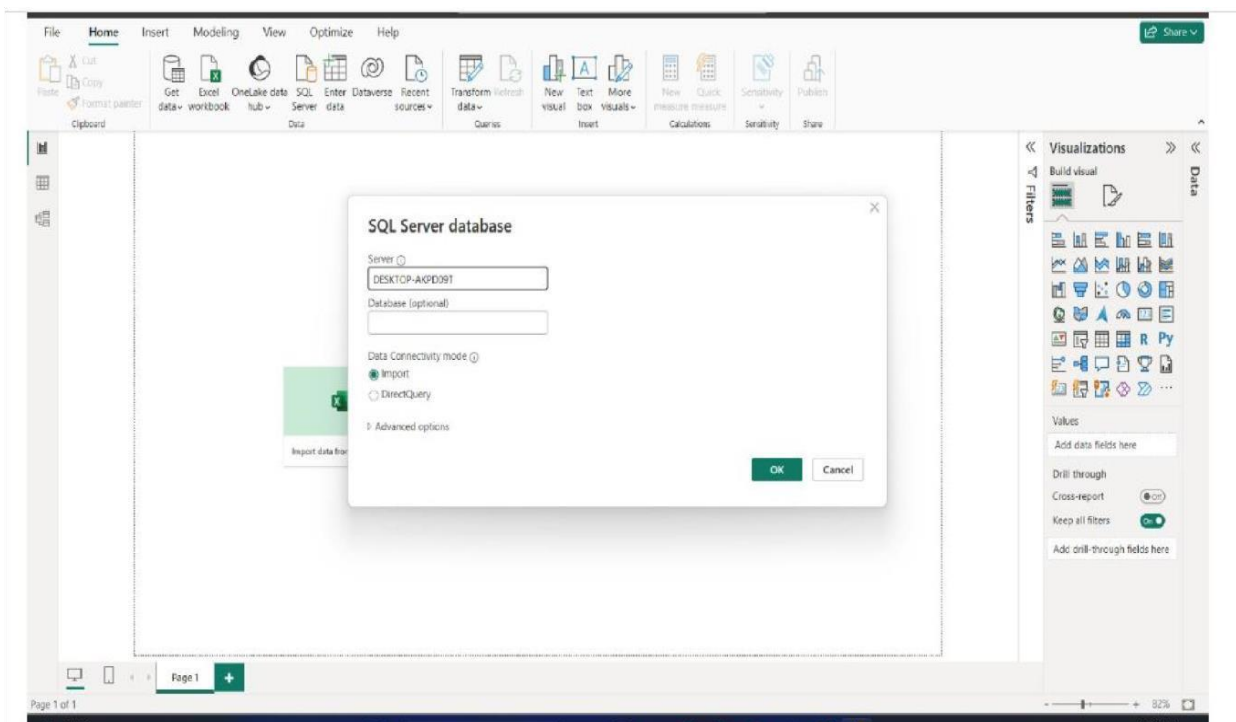
Accordingly, the data set is being imported from Microsoft SQL Server Management Studio to Microsoft Power BI as follows :

- First, Open “Microsoft Power BI (Desktop)” software application.
- Click on “Get Data” in the Home Tab.
- Next, click on the “SQL Server” option under the “Common Data Sources” to import the data from the SQL Server database.



→ Go click on the Server's Name under the Object Explorer and click on "Properties".

→ Copy the Server's Name and paste it to the "Server" under the SQL Server database in MS Power BI.



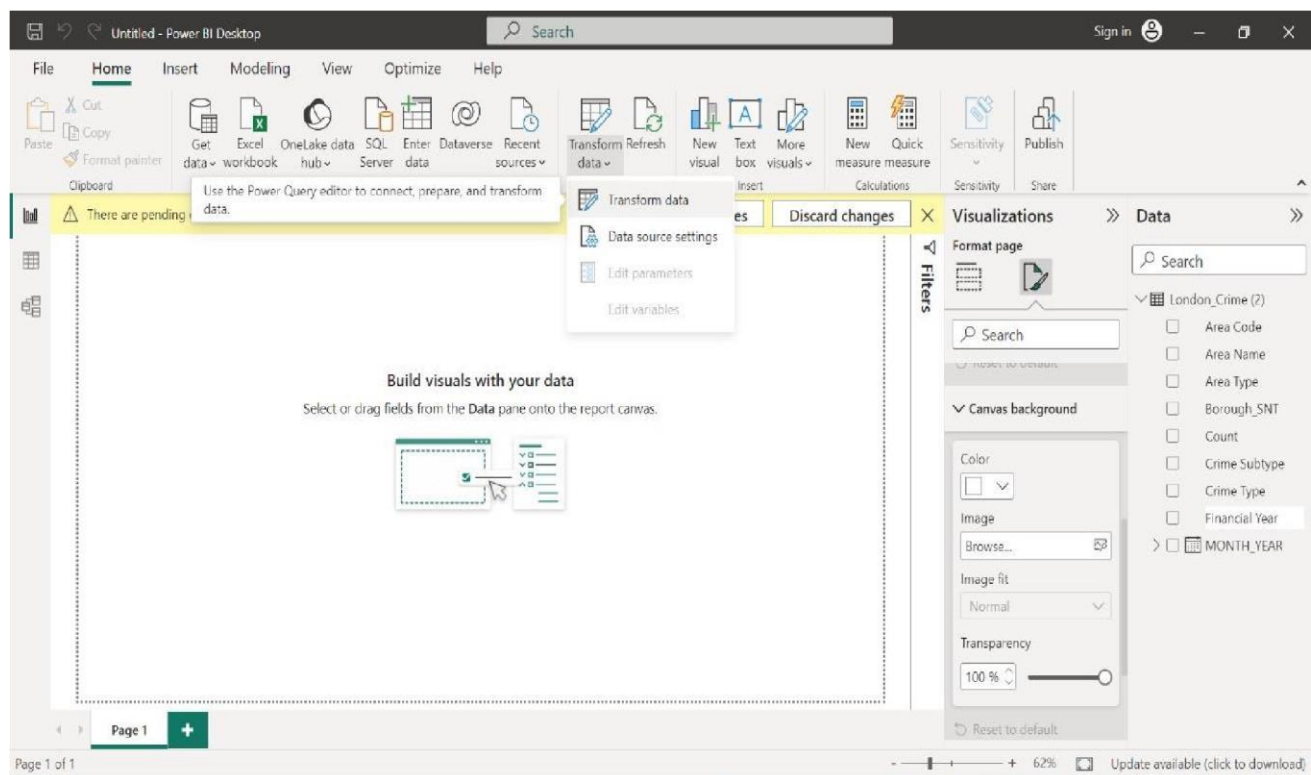
→ Click on the “LondonCrimesDB” database from the “Navigator” and click on the “London Crime” view.

→ To create the dashboard, click “Load” to load the database.

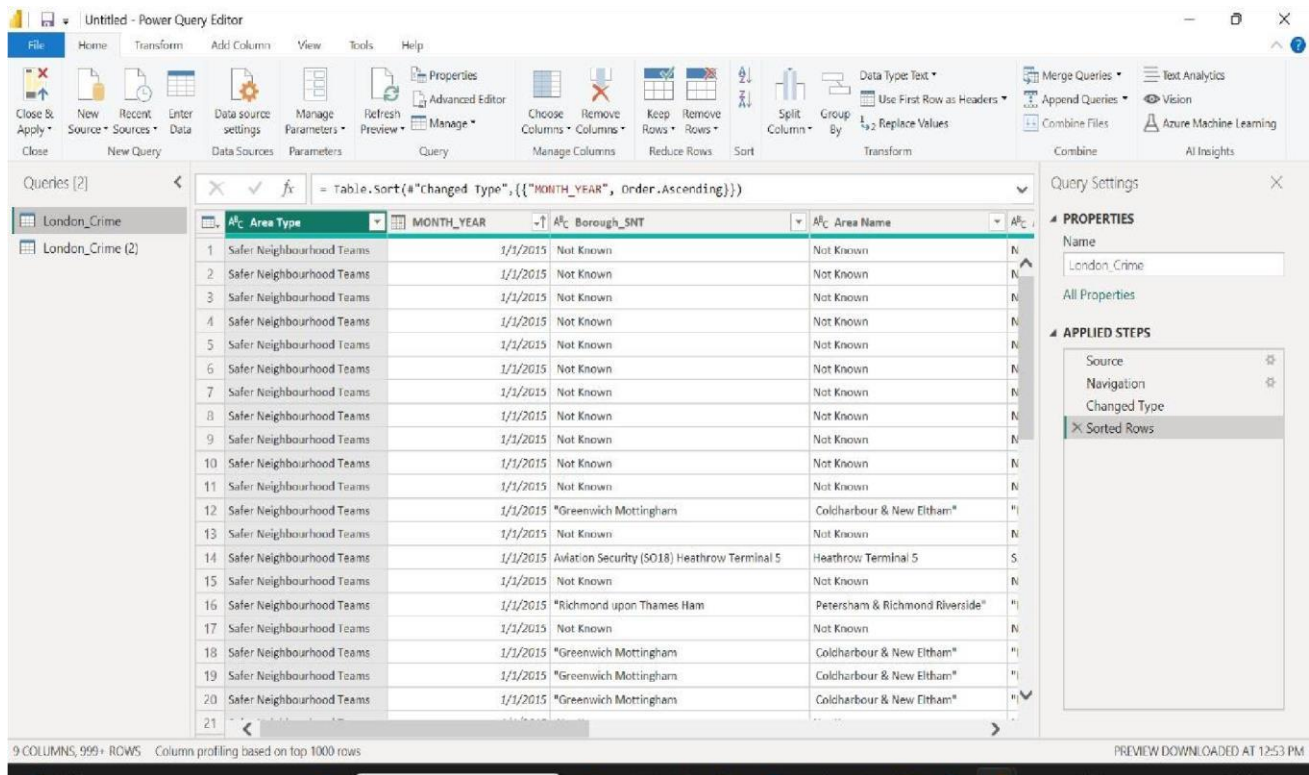
3.2. Transformation of Data in MS Power BI

Accordingly, after the data set is imported, before starting to design dashboard, data should be transformed as per requirement.

For this, we should click on “Transform Data” on the Queries Tab.

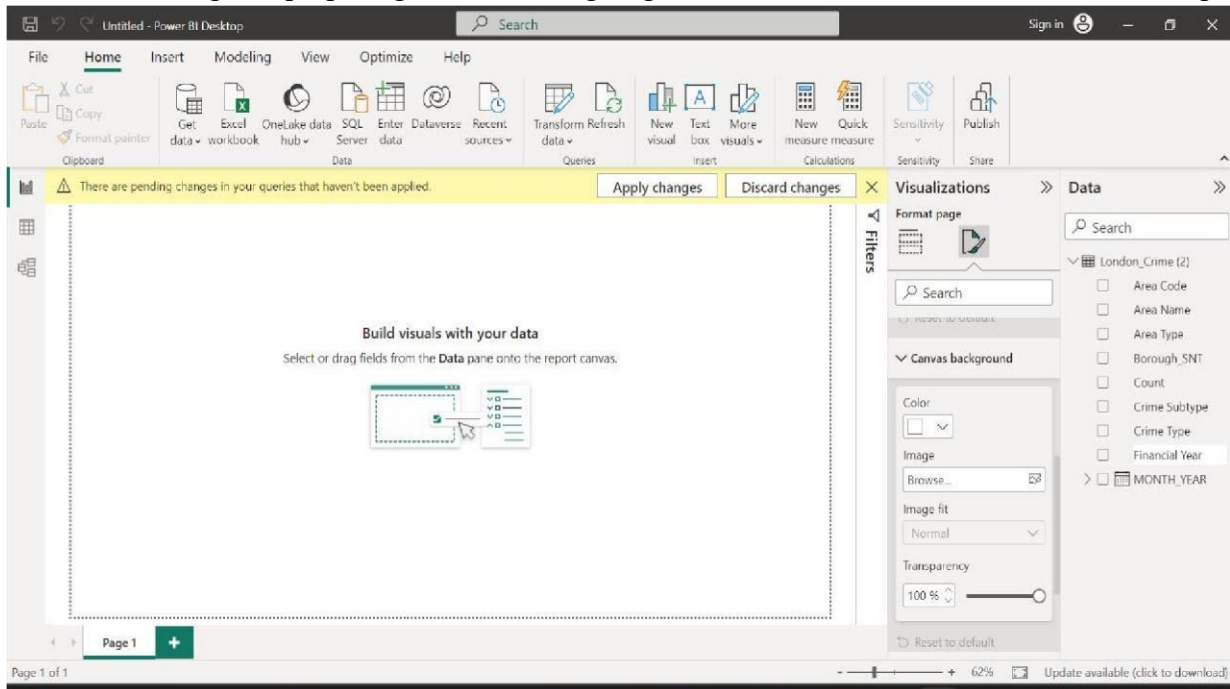


After, selecting the “Transform Data” option, it opens a “Power Query Editor” Window where we can work on transforming the data into the required and suitable type.



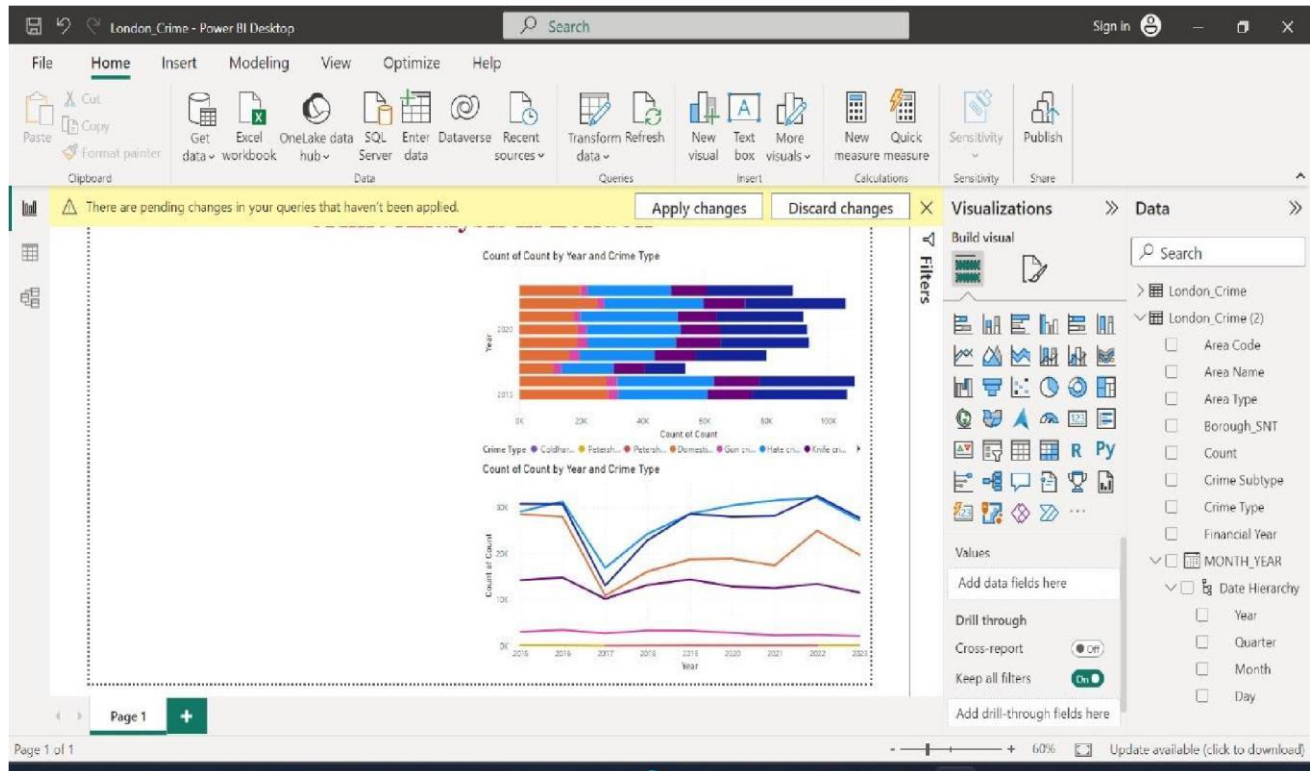
3.3. Designing the dashboard

After transforming and preparing the data, designing the dashboard can be started on the workspace.



The visualizations (maps, charts, graphs, etc) required to prepare the dashboard can be obtained by clicking on “Build Visualization” on the Visualization Tab.

Then, a “Visualizations” pane shall appear. Through this pane, the type of visualization required can be selected out of various options. Also, the necessary editing for the selected graph/chart/maps etc. is also done on this Pane.

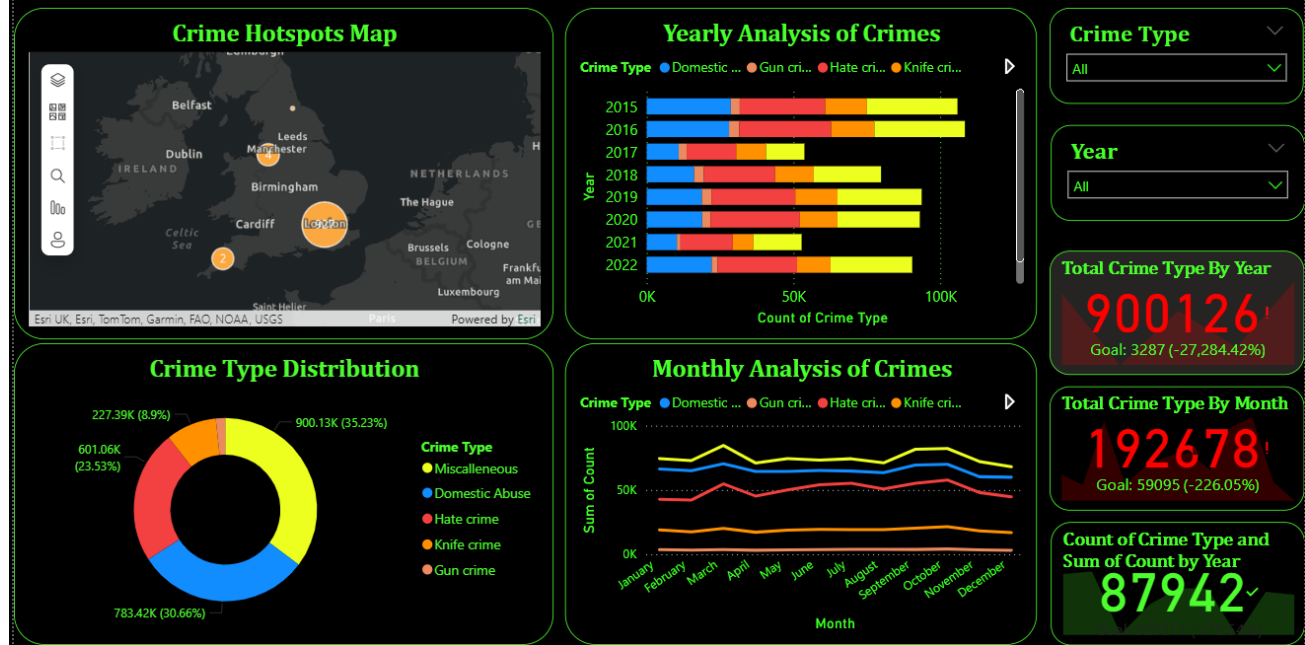


The dashboard can be constructed by adding a variety of visualizations and then completed and finalized utilizing the visualizations offered in MS Power BI.

3.4. Dashboard Illustration

The completed and finalized dashboard for the UK Metropolitan Police Service (MPS) Monthly Crime Datasets is depicted below.

Crimes Analysis in Greater London Metropolitan Police Areas



04. DASHBOARD OVERVIEW

This dashboard created mainly provides a detailed visual representation of Greater London's crime related patterns.

4.1. Analysis of the Dashboard

- **Crime Hotspots Map : Geo-Spatial Analysis**



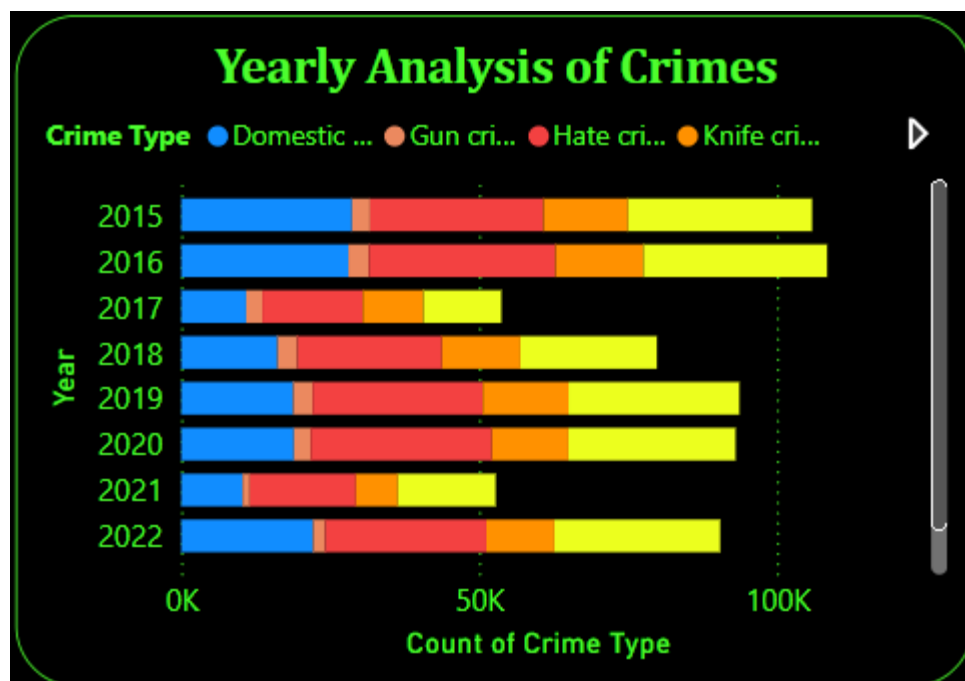
The Geospatial Analysis shows the occurrence of Crimes over the Greater London areas. The Borough_SPN was taken as the Location, the Count as the Bubble Size of the Map for the Geospatial Analysis.

- **Annual Crimes Analysis**

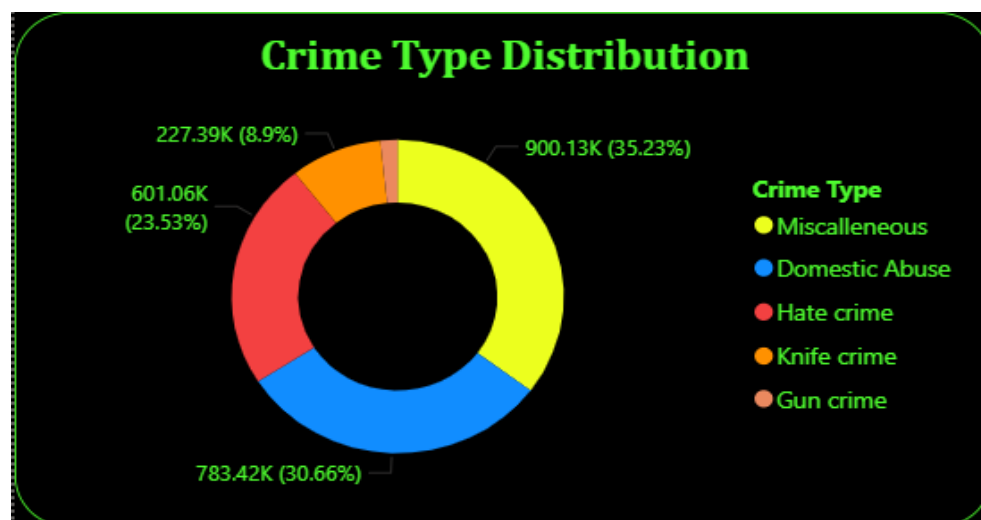
The Annual Crimes Type shows the occurrence of the different types of Crimes over the Greater London areas in each year. The Month_Year was taken as the Y-axis and the the Count as the X - axis. For the legend the Crime Type was used.

Accordingly, the most no. of crimes have occurred in the 2016 and the least in 2021, 2017.

The Gun Crimes are the least type of crime that has occurred annually while Domestic, Hate, Knife are the mostly occurred crimes comparatively.



• Crime Types Distribution

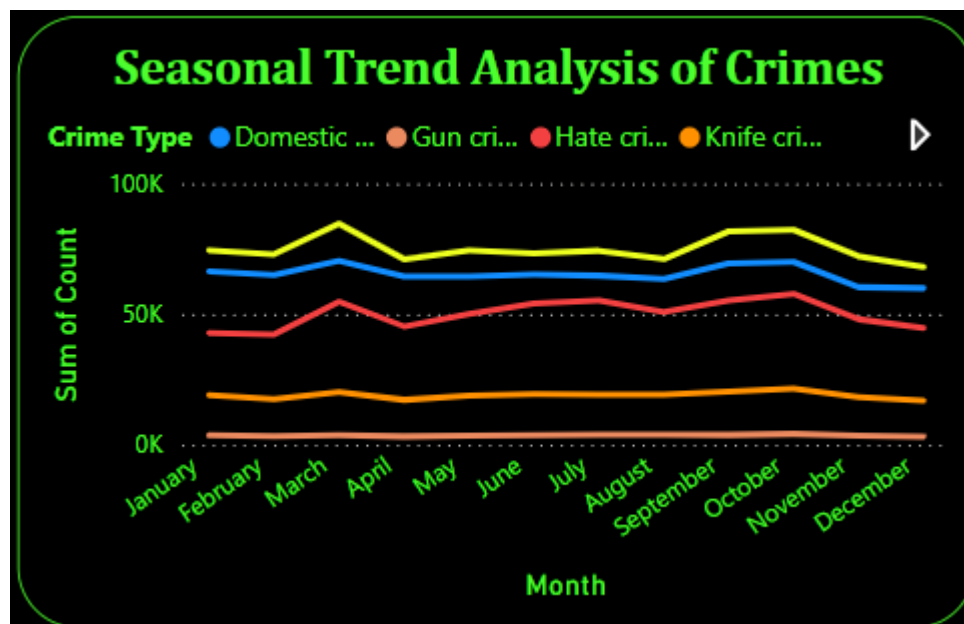


Crime Types Distribution shows the occurrence of the different types of Crimes occurred over the Greater London areas as a total. The Count, and the Crime Type was used as the variables for this chart. For the legend the Crime Type was used. Accordingly, the most no. of crimes are Miscellaneous while the least are Gun Crimes.

• Seasonal Trend Analysis

The Monthly Analysis of Crimes shows the occurrence of the different types of Crimes occurred over the Greater London areas as a total on an Annual Basis.

Accordingly, the most no. of crimes have occurred in March while the least have occurred in December. This chart clearly also shows the sum of crimes count that has occurred in ascending order when we look from bottom to top.



4.2. Purpose

The Monthly Crime Datasets dashboard from the UK Metropolitan Police Service (MPS) serves several functions, the primary one being to provide complete, up-to-date insights into crime patterns and trends in Greater London. It enables law enforcement agencies, legislators, researchers, and the general public to identify crime hotspots, track trends over time, allocate resources effectively, and develop educated plans for crime prevention and community safety. The dashboard improves openness, encourages data-driven decision-making, and fosters collaboration among stakeholders to better manage and prevent illegal activity.

4.3. Insights

The insights that can be provided referring to the dashboard can be elaborated as follows :

Seasonal Trend Analysis :

- Visual: A line graph depicting monthly crimes over time.
- Goal: Identify peak months, seasonal patterns, or market trends by understanding the overall trend in crimes occurred.

Total Crime Times :

- Visual: A doughnut chart depicting the sum of crime percentages.
- Goal: Identify the most and least occurred crimes in the UK as a percentage.

Geospatial Analysis :

- Visual: Map visualization of regional crimes distribution.
- Goal: Identify areas with higher or lower risks of crimes, assisting users in understanding the regional dynamics as well.

Annual Crime Analysis :

- Visual: A component bar chart indicating the quantity of crimes in various years.
- Goal: Identify the annual trends by analysing the number of crimes occurred within particular year.

4.4. Limitations

While the Monthly Crime Datasets dashboard from the UK Metropolitan Police Service (MPS) is a great resource, it has significant drawbacks.

- For starters, the dashboard may lack real-time updates, resulting in a delayed reflection of current crime patterns.
- Due to data aggregation, it may not provide comprehensive statistics on certain crime types or geographic areas.
- Faults with data correctness, completeness, or consistency may have an impact on the reliability of analysis and decision-making based on the dashboard.
- The dashboard's accessibility and usability may provide difficulties for users who are unfamiliar with data interpretation or lack technological competence.

4.5. Recommendations

- Understanding the subtleties and limitations of the UK Metropolitan Police Service (MPS) Monthly Crime Datasets display is critical for users accessing the dashboard. To begin, assess the data contextually, keeping in mind that crime figures may differ due to factors such as reporting biases or changes in policing procedures.
- Examine the data critically, taking into account time trends and regional inequalities, and crossreferencing multiple data points to gain comprehensive conclusions.
- Make efficient use of the dashboard's filters and visualizations to extract specific information and detect patterns.
- Use the provided tools to compare crime types, geographical locations, or time periods, allowing for a more in-depth understanding of crime dynamics in Greater London.

05. CONCLUSION

This report provides information about different kinds of recorded crimes in the Greater London in the United Kingdom. This process includes the extraction of the crime data from the years 2015 to the year 2023 respectively. Where they are incorporated to the SQL Database Server then to the Microsoft Power BI using the T-SQL after cleaning the data using Microsoft Excel.

This method ensured the ease of access to the data collected for the visual representation of the data as maps, charts and graphs using tables and views.

The dashboard consists of the Analysis of Total Crime Types per Year, Analysis about the Total Crime Type by Year, Analysis about the Total Crime Types and a Map Visualisation Analysis.

The Monthly Crime Datasets dashboard from the UK Metropolitan Police Service (MPS) is an invaluable resource for a wide range of users, including law enforcement agencies, policymakers, researchers, and the general public. This dashboard facilitates informed decision-making and proactive community safety initiatives by offering accessible and granular data into crime patterns and trends in Greater London. The dashboard's data can be used by law enforcement experts to detect crime hotspots, effectively allocate resources, and develop targeted activities for crime prevention. Policymakers obtain a thorough grasp of emerging crime trends, allowing them to create evidence-based policies and more efficiently allocate money. The enormous dataset benefits researchers by allowing them to conduct in-depth analysis, identify linkages, and offer novel solutions to social concerns associated to crime.

Furthermore, the public gets transparency and information about local crime incidences, instilling a sense of empowerment and involvement in the improvement of neighborhood safety. Users should, however, interpret the data with caution, taking into account constraints such as probable underreporting or changes in crime recording systems. Overall, the MPS Monthly Crime Datasets dashboard is an important tool for promoting collaboration, allowing data-driven solutions, and creating a safer and more informed community in Greater London.

REFERENCES

- Dataset : <https://data.london.gov.uk/dataset/mps-monthly-crime-dahboard-data>
- <https://www.met.police.uk/>