General Sir John Kothelawala Defence University

Faculty of Management, Social Science and Humanities

Department of Languages

BSc in Applied Data Science and Communication

SQL for Data Science (LB1224)

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Group Assignment – Task 2

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Yorkshire and Humber Regional Crime

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1. Introduction

This report covers the design and development of a data-driven crime analysis dashboard for the Yorkshire and Humber Regional Organized Crime Unit (YHROCU). This project is being undertaken with the main objective of making crime statistics across the Yorkshire and Humber region-consisting of the West Yorkshire, South Yorkshire, Humberside, and North Yorkshire police force areas-accessible in an easy and understandable, interactive manner to any law enforcement bureau. The dashboard is targeted at assisting operational decision-making, crime prevention strategies, and the process of resource allocation by visualizing the total crimes, categories of crimes, and the pattern of regional crimes.

This report is targeted at stakeholders within the Yorkshire and Humber Regional Organized Crime Unit (YHROCU), inclusive of law enforcement officers, crime analysts, and regional policymakers. It shall inform these groups in making sense of the crime landscape in the region, identification of trends in crime, and consequently making data-driven decisions to improve public safety and operational efficiency.

2. Methodology

2.1. Importing Data

To create the dashboard, the data set was imported from the official Police data website. https://data.police.uk/data/
Then they were included into a new folder and rename the folder as Yorkshire Crime.

2.2. Crating Data Base in SQL

Database > New Database > Database Name > ok
Double click on Yorkshire Crime > Task > Import Flat Files > Next > Browse > Yorkshire Crime > YorkshireCrimeDB >Next

2.3. Data Cleaning Part

Change the column names and change the data type accordingly.
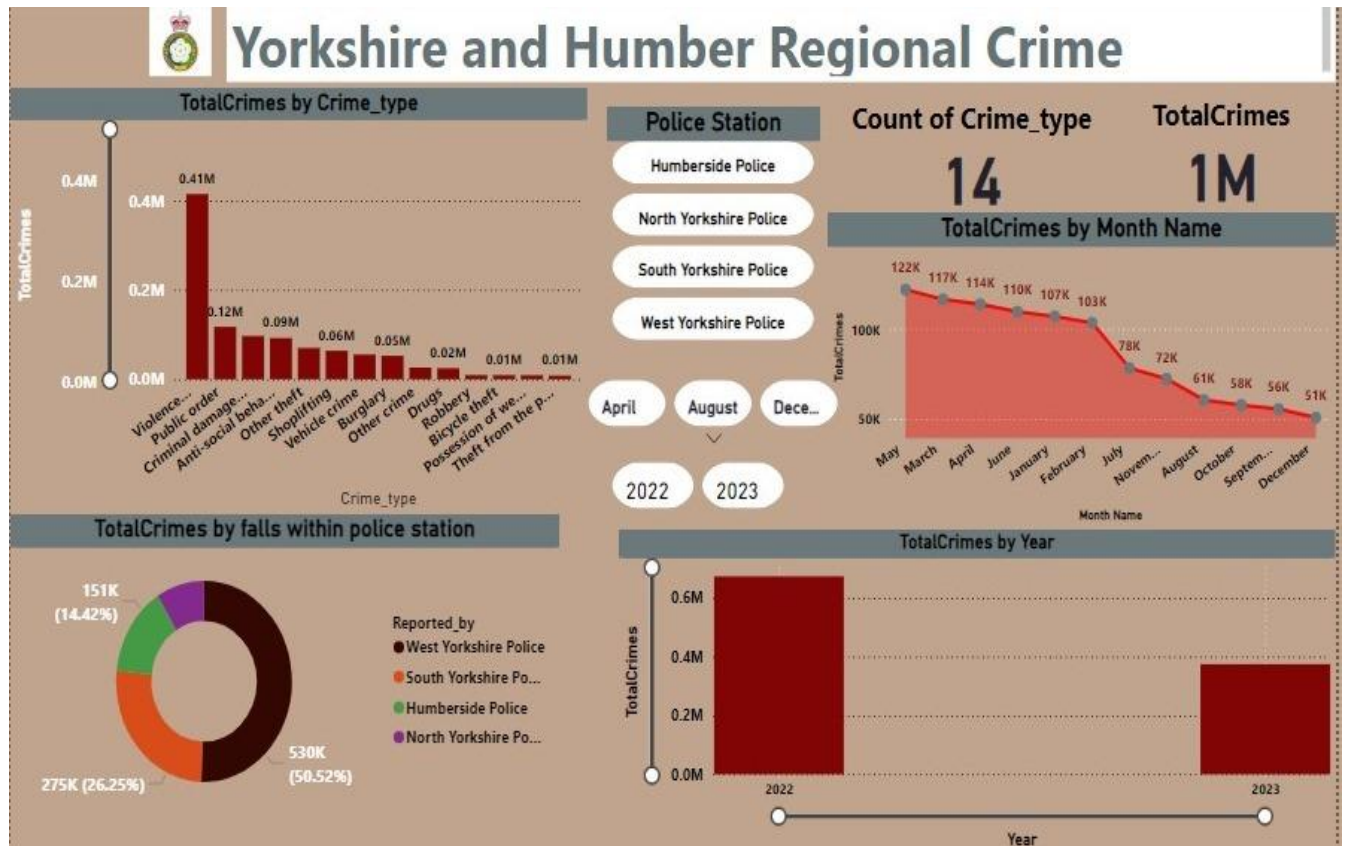Then insert primary key and insert allow nulls>next>finish
Next imported the datasets into power BI through the following steps.
Get data>SQL server>server name>ok

Then select the Yorkshire Crime datasets which we imported previously to the SQL.

3. Visualization

3.1.   Dash Board Review

The dashboard consists of several key elements:

- **Total Crimes Overview**: Displays the total number of crimes reported in the dataset.
- **Comparison Between 2022 and 2023**: Shows how crime rates have changed between these two years.
- **Police Station Crime Reports**: Breaks down the number of crimes reported by different police stations in Yorkshire.
- **Total Crimes by Month**: Displays the monthly distribution of crimes throughout the year.

- **Crimes by Type**: Lists different types of crimes and shows the frequency of each

This dashboard has included the information about Yorkshire and Humber Regional Organized Crime Unit of two years (2022,2023) and months. dashboard has included a slicer to filter the variation of information year by year. And, there is another slicer to filter the variation of information month by month. We use bar charts, donut charts, line charts, cards and column charts to visualize the information which we found from the monthly crime datasets published on https://data.police.uk/data/ dataset.

3.2.   Total Crimes

By using the card visualization dashboard visualizes the total crimes in West Yorkshire police station, South Yorkshire police station, Humberside police station and North Yorkshire police station in 2022 and 2023. According to the visualization of the total crimes of above police stations in two years, it reveals the number of crimes occurred in two years as 1million.

3.3.   Crime Type

There is another card to visualize the total crime types in West Yorkshire police station, South Yorkshire police station, Humberside police station and North Yorkshire police station in 2022 and 2023.   According to the visualization the total crime types of above police stations in two years is 14. This visualization helps to understand the variety of crimes happening in the region, such as violent crime, theft, and drug-related offenses.

3.4.   Total Crimes by Year

We use a clustered column chart to visualize the total crimes by year. The y axis represents the total crimes in the above police stations. The x axis represents the year. The total crime of four police stations in 2022 is 673 709. The total crime of four police stations in 2023 is 374 875. This column shows that more crimes were reported in 2022 than in 2023, with approximately 298 834 crimes in 2022 and a decrease in 2023. This suggests that the crime rate may be going down in 2023 than in 2022.

3.5.   Police Station Crime Report

Donut chart to visualizes the total crimes that occurred in responsible geographical areas of four police stations of   West Yorkshire police station, South Yorkshire police station, Humberside police station and North Yorkshire police station.

The largest percentage of crimes, 49.83**%** (335 701 crimes), was reported by West Yorkshire Police in 2022, making it the region with the most crime. The lowest percentage of crimes, 9.15**%** (61 676 crimes), was reported by North Yorkshire Police in 2022.from this chart in 2022 South Yorkshire, Humberside, and North Yorkshire also reported significant numbers of crimes but at a much lower rate than West Yorkshire. The largest percentage of crimes, 51.76**%** (194 018 crimes), was reported by West Yorkshire Police in 2023, making it the region with the most crime. The lowest percentage of crimes, 8.18**%** (30 675 crimes), was reported by North Yorkshire Police in 2023.from this chart in 2023 South Yorkshire, Humberside, and North Yorkshire also reported significant numbers of crimes but at a much lower rate than West Yorkshire. These insights suggest that Urban areas tend to have more complex social issues, higher population densities, and greater economic disparities, all of which can contribute to higher crime rates.

3.6.   Total Crime Distribution Over the Months

The line chart of the dashboard visualizes the total crime distribution over different months. The line chart shows that crime rates were highest in May, July and August. It shows approximately 60 000 crimes, but then the total crimes gradually declined toward the end of the year of 2022. The crime rates were highest in March, April and May. It shows approximately 57 000 crimes, but then the total crimes gradually declined toward the end of the year of 2023. This suggests possible seasonal patterns, where crime might be higher during warmer months. After the peak in July, the crime rate starts to decline toward the end of the year, with the lowest numbers seen in the later months like November and December.

By using cluster column chart, it visualizes the total crime distribution by different crime types which means it reveals what kinds of crimes are most common in the region, which helps in prioritizing law enforcement efforts. Violence crime has the highest distribution over two years which indicates that violence crime is the biggest challenge for the region.

4. Conclusion

In conclusion, the database was built using raw data extracted from the official Police data website. https://data.police.uk/data/ dataset, which provides details on Yorkshire and Humber Regional Organized Crime Unit (YHROCU) to monitor regional crime stats using monthly crime. The raw data has been transformed into helpful information to comprehend the crime statistics of e Yorkshire and Humber region. It covers the four police force areas of West Yorkshire, South Yorkshire, Humberside and North Yorkshire.

In summary, the dashboard helps identify key crime trends, regional hotspots, and seasonal variations, guiding law enforcement to prioritize resources and improve public safety in Yorkshire.