Title: Analysing the Dynamics of the Delhi Metro Network: A Data Analytics Project Report

Introduction:

The Delhi Metro Network stands as a lifeline for millions of commuters in the bustling capital city of India, offering a convenient and efficient mode of transportation. This data analytics project delves into the intricacies of the Delhi Metro Network, aiming to uncover insights, trends, and patterns within the system. By analysing various aspects such as ridership, station connectivity, peak hours, and route efficiency, this report sheds light on the operational dynamics of one of the largest metro networks in the world.

Below is the process we can follow for the task of Metro Network Analysis of Delhi:

1. Determine what you want to achieve. It could be optimizing routes, reducing congestion, improving passenger flow, or understanding travel patterns.
2. Collect data on metro lines, stations, connections, and transit schedules.
3. Clean the data for inconsistencies, missing values, or errors.
4. Create visual representations of the network, such as route maps, passenger flow charts, or heat maps of station congestion.
5. Analyse how effectively the network handles passenger traffic and meets operational targets.

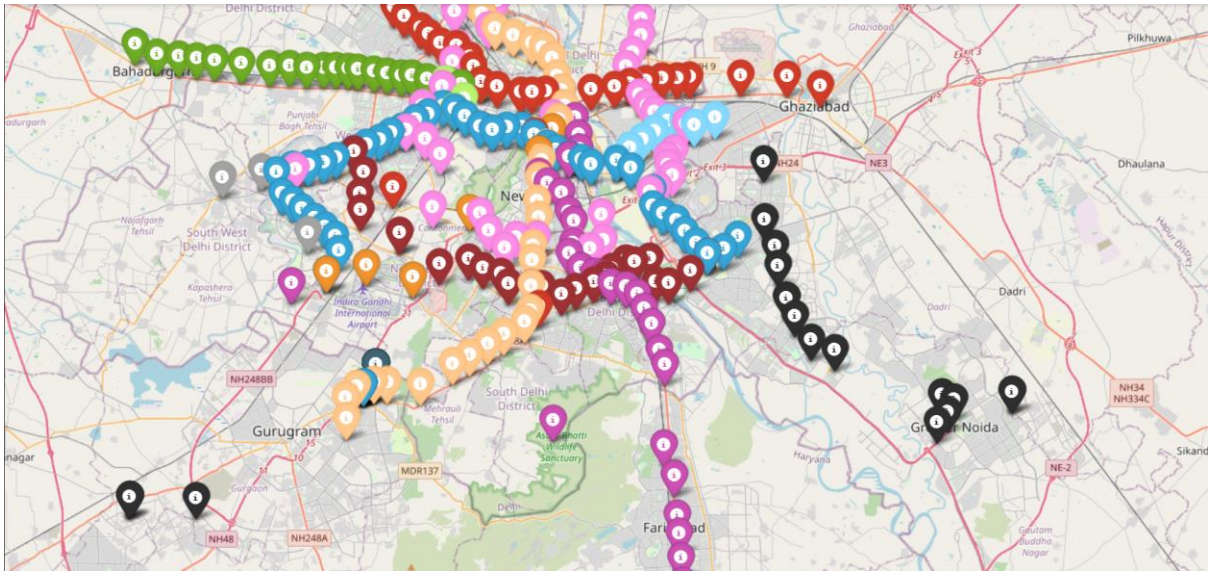
The provided dataset contains detailed information about the Delhi Metro network, one of the largest and busiest urban transit systems in the world. Key features of the dataset include:

Station Information:	Names and IDs of metro stations.
Geographical Coordinates:	Latitude and longitude of each station.
Line Information:	The specific metro line each station belongs to.
Distance Data:	The distance of each station from the start of its line.
Station Layout:	Type of station layout (e.g., Elevated, Underground, At-Grade).
Opening Date:	Date of inauguration of each station.

Task done in the project:

1. Map the stations to visualize the coverage and distribution of the metro network across Delhi **(Geospatial Analysis)**.

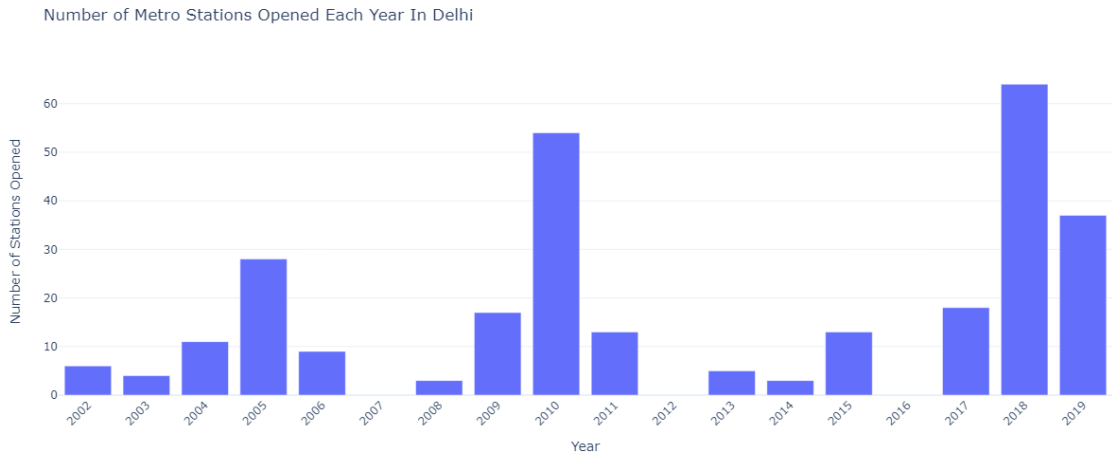
The analysis starts with visualizing the locations of the metro stations on a map, thus providing insights into the geographical distribution of the stations across Delhi. We use latitude and longitude data to plot each station.



Each marker represents a metro station.

2. Examine characteristics of different metro lines, including station count and average distances between stations **(Temporal Analysis and Line Analysis)**.

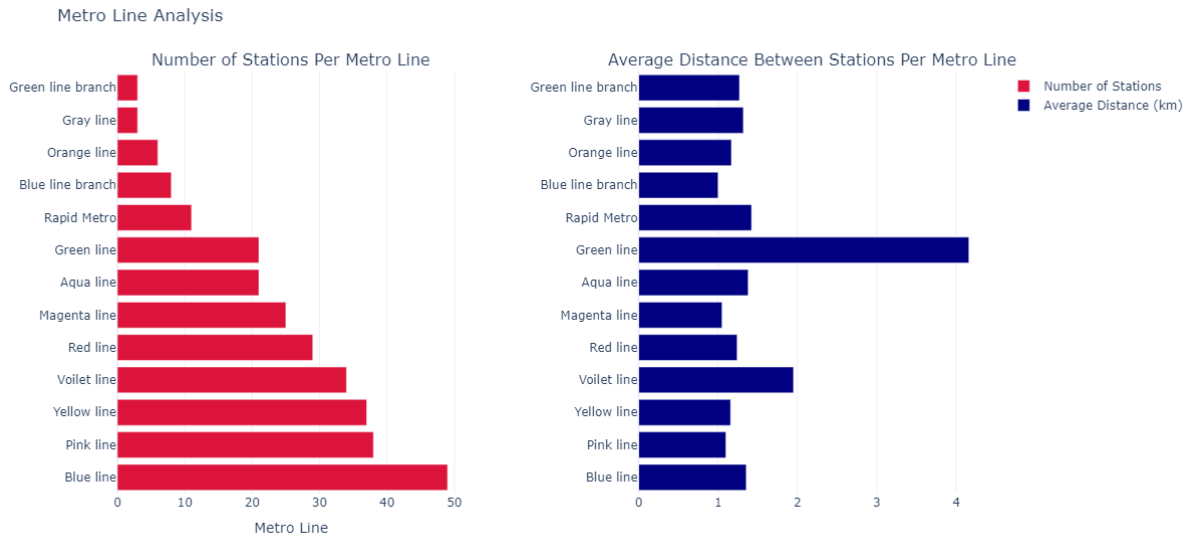
Temporal Analysis is used to analyse the growth of the Delhi Metro Network over time, how many stations were opened each year and visualize the growth. It provides insights into to pace of metro expansion and its development phases.



Some key observations include:

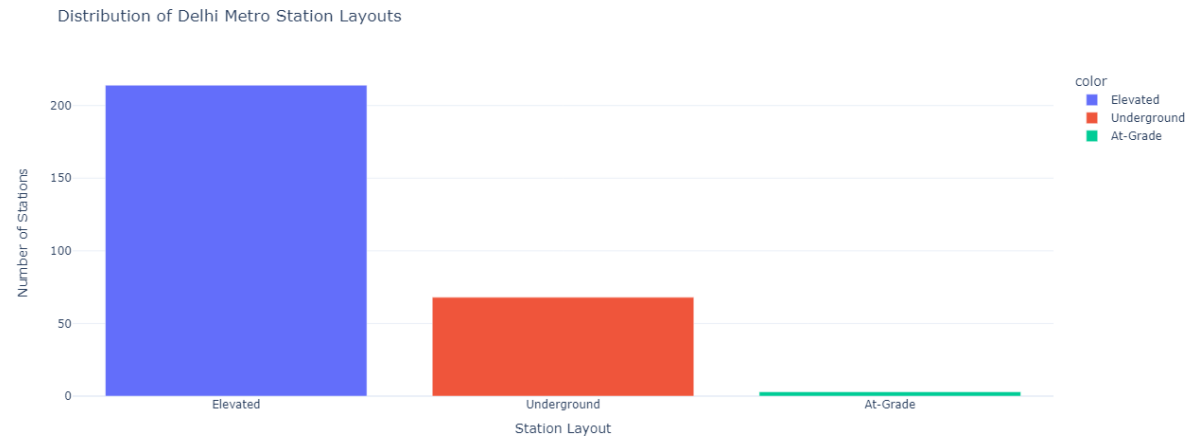
- Some years show a significant number of new station openings, indicating phases of rapid network expansion.
- Conversely, there are years with few or no new stations, which could be due to various factors like planning, funding, or construction challenges.

Line Analysis analyse the various metro lines in terms of the no. of stations they have and the average distance between the stations. It will give us insights into the characteristics of each metro line, such as which lines are more extensive or denser.



3. Analyse the types of station layouts and their distribution across the network **(Station Layout Analysis)**.

Station Layout Analysis explores the station layouts (Elevated, Ground Levels, Underground).



The bar chart and the counts show the distribution of different station layouts in the Delhi Metro network.

Observations:

- Elevated Stations: The majority of the stations are Elevated. It is a common design choice in urban areas to save space and reduce land acquisition issues.
- Underground Stations: The Underground stations are fewer compared to elevated ones. These are likely in densely populated or central areas where above-ground construction is less feasible.
- At-Grade Stations: There are only a few At-Grade (ground level) stations, suggesting they are less common in the network, possibly due to land and traffic considerations.

Conclusion:

Analysing the Delhi Metro Network through a data analytics lens offers valuable insights into its operational dynamics and performance metrics. Through continuous monitoring, analysis, and implementation of recommendations derived from this project report, stakeholders can drive positive changes that benefit commuters and stakeholders alike within the Delhi Metro Network ecosystem.