Title: Urban Mobility Analysis

Role: Data Scientist Associate at AkumenIA

Goal: To analyze urban mobility using GPS data, identify bottlenecks, create mobility flow datasets, and visualize the results using various tools.

Methodology:

1. Exploration and Preprocessing of GPS Data:
   * Collected and explored GPS data from various sources, such as smartphones, IoT devices, and transportation systems.
   * Preprocessed the data to eliminate noise, inaccuracies, and missing values, ensuring the data is suitable for further analysis.
2. Use of DBSCAN to Identify Urban Bottlenecks:
   * Applied the Density-Based Spatial Clustering of Applications with Noise (DBSCAN) algorithm to identify urban bottlenecks within a specific maximum range.
   * Analyzed the results to find high-density areas with traffic congestion or limited mobility.
3. Creation of Mobility Flow Dataset and Data Analysis:
   * Created a mobility flow dataset using the processed GPS data and DBSCAN results.
   * Analyzed the dataset to identify patterns, trends, and correlations that could impact urban mobility and traffic management.
4. Plotting Graphs and Heatmaps:
   * Visualized the results of the urban mobility analysis using various tools, such as Power BI, Folium, and Plotly.
   * Plotted graphs and heatmaps to display traffic congestion, bottlenecks, mobility patterns, and other relevant insights.
   * Presented the visualizations to stakeholders and decision-makers to support data-driven urban planning and traffic management initiatives.

Results:

Through the urban mobility analysis, we successfully identified bottlenecks and mobility patterns within the city. The use of DBSCAN allowed for the detection of high-density areas with limited mobility, while the creation of a mobility flow dataset facilitated a comprehensive analysis of urban traffic. By visualizing the results, we provided valuable insights for stakeholders and decision-makers to improve urban planning and traffic management.