**Deep Learning-Based Smart City Planner - Traffic Congestion  
  
Abstract**

Traffic flow prediction plays a crucial role in urban planning, congestion management, and real-time transportation systems. This study evaluates the performance of various deep learning models for traffic prediction across four different junctions. The dataset underwent preprocessing, including train-test splitting and feature-target transformation with time-step dependencies. Five models were implemented and compared: a custom neural network with a custom dense layer, GRU (Gated Recurrent Unit), LSTM (Long Short-Term Memory), CNN (Convolutional Neural Network), and MLP (Multi-Layer Perceptron).

Model optimization involved learning rate schedules and early stopping criteria to improve training stability. Performance was assessed using Root Mean Squared Error (RMSE), and results were visualized to compare predicted and actual values, alongside data normalization recovery for interpretability. The findings highlight variations in model performance across different junctions, identifying a consistently superior model. These insights support the advancement of scalable, accurate, and smart traffic prediction systems, contributing to future innovations in transportation technologies.

**Keywords**: traffic flow prediction, deep learning models, urban planning, GRU, LSTM, CNN, MLP, RMSE, time-series forecasting, smart transportation systems.