Requirement Analysis

1. Technical Requirements:

* **Programming Language:** Python
* **IDE & Tools**: Anaconda, Jupyter Notebook, Visual Studio Code
* **Frameworks & Libraries:**

  Machine Learning: Scikit-learn, TensorFlow or PyTorch

  Data Analysis & Visualization: Pandas, NumPy, Matplotlib, Seaborn

  Computer Vision (if using video input): OpenCV

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2. Functional Requirements:

* Ingest traffic data from multiple sources (videos, sensors, etc.)
* Preprocess and clean traffic data automatically
* Train and test machine learning models for traffic volume prediction
* Display traffic volume estimations with charts or dashboards
* Export analysis results (CSV or PDF format)
* Option to tune model parameters and re-train models
* Basic UI to input data or view live predictions (optional)

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3. Constraints & Challenges:

* Availability and quality of real-time or historic traffic datasets
* Hardware limitations for training large ML models
* Ensuring high accuracy in varying traffic conditions (weather, lighting, etc.)
* Scalability for large-scale deployment (optional challenge for future scope)
* Data privacy concerns when using real surveillance footage