# Traffic Flow Detection Using Deep Neural Network Algorithm

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## Abstract

Traffic data plays an important role whenever we want to know traffic flow. This flow of traffic can be used to The traffic flow prediction is mainly based on real-time data which is collected with the help of various cameras and video. In recent times deep learning concepts have been used to detect traffic flow predictions. Deep Neural Networks (DNNs) are powerful models that can achieve excellent performance on learning tasks.DNNs work well whenever labeled features are available. Our method uses the Yolov4 algorithm to make super-fast vehicle detectors with speed and high quality in terms of accuracy. our main result is to find the state of traffic by giving the video as an input which uses Yolov4 as an algorithm.

## Introduction

Traffic analysis is a process by which we can use the analyzed traffic data to make better decisions regarding traffic. with the rapid growth of usage of vehicles produces numerous data which are available through surveillance cameras and closed-circuit television(CCTV).so these sources of data can be used to build an efficient Deep learning model. The deep learning model is a subset of machine learning. which uses neural networks. To identify the vehicles, there are many object detection algorithms like one-stage and two-stage between these two, one-stage/proposal free produces accurate output in the one-stage YOLO algorithm produces efficient and accurate results. By using the YOLO algorithm, we use video data set and generate an image sequence. The generated sequence of images and data of vehicles contained in the image are used to identify the mode of traffic present. The model that has already been trained and built can be used to make better predictions when it comes to traffic data. This decision is used to solve the problems and challenges that are being faced with the flow of traffic like traffic jams, accident zone areas, traffic diversion, and traffic congestion.

## Objectives

- Develop a system for tracking vehicles in real-time video streams.
- Implement a deep learning model to make predictions about traffic conditions based on vehicle tracking data.
- Evaluate the performance of the system on real-world traffic data.

## Implementation

**YOLOv4 Algorithm:** YOLOv4 is a state-of-the-art object detection algorithm that is capable of real-time object detection in live video streams. YOLOv4 improves upon previous versions of the YOLO algorithm by incorporating a number of advanced features, including a more efficient backbone network, improved object detection and tracking capabilities, and better performance on a wide range of object detection tasks.

## Literature Survey

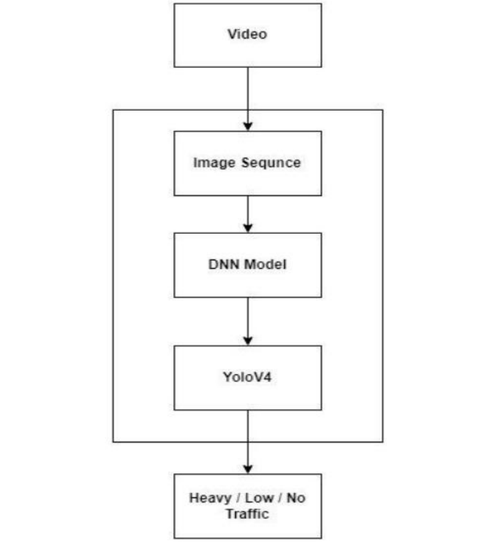
In order to develop an intelligent transport system, it is very much essential to have a proper traffic forecast. In the previous years a lot of solutions to the new features of traffic have already been followed. The intelligent transportation system which supports updated transportation network planning and also management of traffic have already been adopted by major cities in the last twenty years. In today's world, various machine learning (ML and specifically deep learning) techniques that are capable of operating massive loads of both real-time and historic data are often used to forecast short-term traffic flow.

## Proposed System Design

Requirements:

- Access to live video streams from traffic cameras or other sources.
- A deep learning model for vehicle detection and tracking.
- Algorithms for analyzing vehicle tracking data and making traffic predictions.
- A user interface for interacting with users and displaying traffic predictions.

**Proposed System Architecture for Object Detection:** The proposed system architecture for object detection consists of several key components: an input layer, a series of convolutional layers, a detection layer, and an output layer. The input layer receives the video input from the video input module and passes it to the convolutional layers for processing. The convolutional layers extract features from the input data, which are then passed to the detection layer for object detection. Finally, the output layer generates the final output of the object detection process, which is passed to the traffic prediction module for further analysis.




## Results

The proposed system has been implemented and tested on real-world traffic data. The system is capable of accurately detecting and tracking vehicles in live video streams, and it can make accurate predictions about traffic conditions based on vehicle tracking data. The performance of the system has been evaluated on a variety of metrics, including detection accuracy, tracking accuracy, and prediction accuracy. The results show that the system performs well across a wide range of traffic conditions, making it well-suited for use in traffic detection applications. The system uses the YOLOv4 algorithm for object detection, which is capable of processing video streams at very high speeds while maintaining high accuracy. The system has been implemented and tested on real-world traffic data, and the results show that it is capable of accurately predicting traffic conditions based on vehicle tracking data.

## References

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