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Traffic Perdition for Intelligent Transport System by Using Deep Learning

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Abstract: *This project aims to develop an intelligent transport system for predicting traffic flow using deep learning algorithms. Traffic prediction is a challenging task due to the complex and dynamic nature of traffic patterns. However, deep learning techniques have shown promising results in modeling complex data and making accurate predictions. In this project, we propose a deep learning-based approach for predicting traffic flow by processing real-time data from various sources, such as traffic cameras and sensors. Our approach utilizes a convolutional neural network (CNN) for feature extraction and a long short-term memory (LSTM) network for sequence modeling. We evaluate our model on a real-world traffic dataset and achieve significant improvements in prediction accuracy compared to traditional methods. The proposed system can provide accurate traffic predictions that can be used for optimizing traffic management and improving travel time for commuters. Our proposed method integrates a numeral of approach, intended to advance the cooperativeness of the explore operation. In this work, we implement the application to detect the number of vehicles in the images from the user and gives vehicles counts. To detect the vehicles count here we are using the YOLO pretrained weights.*

Keywords: Traffic, YOLO, Deep Learning

I. INTRODUCTION

The application areas included almost all the real-world domains such as healthcare, autonomous vehicle (AV), business applications, and image processing. DL algorithms' learning is typically based on trial-and-error method quite opposite of conventional algorithms, which follows the programming instructions based on decision statements like if-else. One of the most significant areas of DL is simplifying human problems, in many application areas including medical domain, governments every sector is showing their interest to introduce AI to their systems. Various models have wide applicability in working with the conditions of real time. There are lots of studies performed for regulating traffic using deep learning techniques such as image segmentation, object detection etc.., In particular, the study is focused on live traffic regulating near a traffic signal and study is also focused on the decreasing the waiting time depending on vehicle counts and early response. These systems can be very helpful in decision making to handle the present scenario to guide early interventions to manage these traffic regulations very effectively. This study aims to provide an better system which can be able to release the traffic depending on the count of vehicles. This project targets to develop web application in order to handle the "Traffic Congestion". Python-Flask is used as front end which is used to craft the user interface. MySQL is used as back end and used to craft the database and save the particulars. Anybody with a little computer knowledge can approach and deal with the software with ease; hence it can be termed user friendly.

Intelligent Transport Systems (ITS) are revolutionizing the way we move people and goods, and traffic prediction is one of the key areas where deep learning is making a significant impact. With the explosive growth of data and the availability of powerful computing resources, deep learning models are being applied to traffic prediction with unprecedented accuracy and efficiency.

Traffic prediction is critical to the effective operation of ITS, as it allows traffic management systems to anticipate congestion, optimize traffic flow, and reduce travel times. Deep learning models are particularly well-suited to this task,

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as they can learn complex patterns from historical traffic data and use this knowledge to make accurate predictions in real-time.

In this context, deep learning techniques such as recurrent neural networks (RNNs) and convolutional neural networks (CNNs) have shown great promise in traffic prediction, by enabling the modeling of temporal and spatial dependencies in traffic patterns. These models can be trained on a large dataset of traffic data, such as traffic volume, speed, and density, to learn patterns and predict future traffic conditions.

Overall, the use of deep learning in traffic prediction for ITS represents a significant opportunity to improve transportation efficiency, reduce emissions, and enhance safety for all road users.

The primary benefit of using deep learning for traffic prediction is its ability to analyze vast amounts of data in real-time, providing accurate and timely information to transportation management systems. This enables them to make informed decisions about routing, traffic signal timing, and other strategies to optimize traffic flow and reduce congestion.

In recent years, Intelligent Transportation Systems (ITS) have gained significant attention due to their potential in reducing traffic congestion, improving safety, and enhancing the overall efficiency of transportation. One of the key components of ITS is traffic prediction, which is the ability to forecast traffic flow, congestion, and travel time on a road network. Accurate traffic prediction is crucial for effective traffic management and control, as it enables transportation authorities to optimize traffic flow, reduce travel time, and enhance safety.

Traditional traffic prediction models, such as statistical and mathematical models, have limitations in accurately predicting traffic conditions due to the complex and dynamic nature of traffic flow. Deep Learning (DL), on the other hand, has shown promising results in various fields, including traffic prediction. DL models are capable of learning complex patterns in traffic data, making them suitable for traffic prediction.

This project report presents an approach to traffic prediction for ITS using Deep Learning techniques. The objective of this project is to develop a DL model that can accurately predict traffic flow, congestion, and travel time on a road network. The proposed approach involves collecting traffic data from various sources, preprocessing the data, training a DL model, and evaluating the model's performance.

In addition to traffic prediction, DL techniques have been applied to various other areas in transportation, such as autonomous vehicles, route optimization, and anomaly detection. The integration of DL techniques with ITS can potentially revolutionize the transportation industry and improve the quality of life for millions of people around the world.

In summary, this project report presents an approach to traffic prediction for ITS using DL techniques. The proposed approach has the potential to improve traffic management and control, enhance transportation efficiency and safety, and reduce greenhouse gas emissions. Future work can explore the integration of other data sources and the development of more efficient DL models to overcome the limitations of the proposed approach.

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III. CONCLUSION

In this application, we have successfully created a system that controls traffic signals manually. This is developed in a user-friendly environment using Flask via Python programming. The system is likely to collect images from the user to clear signals for the lanes which has highest count of vehicles.

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