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Automatic Vehicle Number Plate Recognition
Using Deep Learning Algorithms to Estimate the Vehicle Storage

Identification and tracking of vehicles are essential for control and surveillance of transport systems. It is important not only for traffic control but also to estimate vehicle storage within a cordon of city. This is vital process in deciding to provide or restrict parking and other relevant facilities based on vehicle storage within a city in a given period of time. This can be identified by tracing vehicle-in and vehicle-out time of city cordon. The most effective method is to track vehicles using vehicle Number Plate (NP) as it is the unique notation for each vehicle.

The manual Number Plate Recognition (NPR), commonly used method, suffers from time and cost as well as errors. With the advancement in applications of artificial intelligent, NPR using image processing became popular.

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There are many researches with different techniques. Edge statistics and the morphology [1] where vehicle number plates and details were captured using still images and videos, Modular systems [2] which is a deep neural network technique, Optical Character Recognition (OCR) techniques [3], combination of RFID and image recognition techniques [4] etc. However, in the recent past deep learning, branch of machine learning, Automatic Number Plate Recognition (ANPR) techniques came to practice. The most widely used technique is Convolutional Neural Network (CNN).
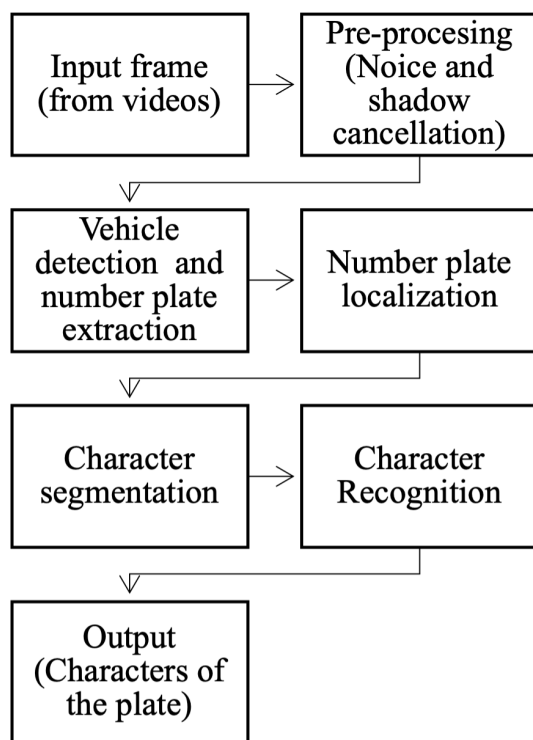

Figure: Basic structure of ANPR model

The objective of this research is to apply ANPR techniques to identify vehicle storage within a city in a given time. This research has two phases. Phase 1 is development of ANPR model by using CNN as it the latest and widely used method. This consist of 3 steps, namely, data collection, model development and model application for predictions. Collected data will be divided in two parts. One for training and model development and the other set of validation. Basic structure of ANPR model is given as above.

After the data is extracted from ANPR model to a database, estimation can be carried out. Data set will include vehicle number, date, time and also location of data collection too can be added.

Phase 2 is applying the model for estimating vehicle storage. After data cleaning, estimation of vehicle storage in a given area for a given period of time will be calculated using NP numbers within the city. Furthermore, this research can be used to estimate the time period a particular vehicle stayed within the city as well.

Therefore, significance of the research is Developing ANPR model using Deep Learning for vehicle storage estimations for a given city and provide evidence based supports for parking management, traffic management and other transport policy makers.

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