



DEVELOP A SYSTEM FOR ELECTRIC VEHICLE RECOGNITION USING MACHINE LEARNING

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Abstract: The future of the automobile industry is electric vehicles which are advantageous to us in many ways. Electric vehicles do not emit pollutants which make them eco-friendly and are generally differentiated with the help of a green license plate. The proposed system aims at building an intelligent model that can recognize electric vehicles such as cars, buses, autos and two-wheelers from its green license plate. The technique used here is image processing which works by processing the images of vehicle license plates. The final objective is to create an automatic authorized electric vehicle recognition machine. The data can be used by the government to conduct surveys and monitor the growth of electric vehicles in society. The data can also be further analysed by environmentalists to understand the level of impact the electric vehicles have on the environment.

Keywords: Electric Vehicles, Recognition, Machine Learning, OpenCV, CNN, Color detection, License plate detection

Introduction: Electric vehicles run partially or fully on electricity. These vehicles produce less pollution when compared to vehicles that run on petrol and diesel. Due to this, the number of electric vehicles is increasing day by day.

Since the shift to electric vehicles is recent, the current license plate detection systems do not detect the green license plates of these vehicles. Therefore, there is a need for a system that detects the license plates of electric vehicles.

The systems that are existing today cannot distinguish between conventional vehicles and electric vehicles. The proposed system aims at eradicating this by adding a feature that allows the system to distinguish between the vehicles.

Keeping a track of the increasing number of vehicles can be complicated and difficult. With this in mind, identification of vehicles that cause violations such as breaking the signals, accidents and so on also becomes difficult. The proposed system can be used

to help eliminate these problems and make the process of identification easier.

Since electric vehicles cause little to no pollution, the data from the proposed system can be further analysed by environmentalists to help them understand the levels of pollution on the road. Thereby helping them formulate environmental plans accordingly.

Related Work: Recognition of license plates have become an important part of ensuring everyday safety of the vehicles and people on the road, as well as making sure to identify those causing problems by breaking traffic rules on the vehicle. The proposed project takes inspiration from this system to be able to recognize the license plates.

Apart from the license plate recognition, the project also uses the ideas behind a color recognition feature with the help of computer vision using OpenCV libraries. This is used to help identify the green color that is present in the license plates of electric vehicles.

The Proposed Method: The proposed system has five objectives to accomplish. They are :

1. To collect data and create a functional dataset.
2. To pre-process the data frame and perform exploratory data analysis.
3. To scale the data and fit it into the model.
4. To include a detection algorithm for detection of license plate.
5. To add color recognition to the model for detection of green license plate.

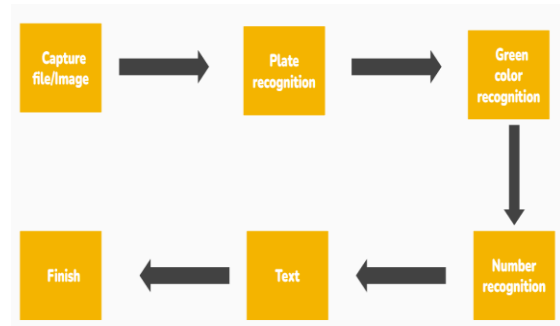


Fig 1. The steps in detection for the proposed system

The fig 1 shows the steps that can be used to detect the electric vehicles by achieving the individual objectives. The methodology used for each of these objectives are as follows:

1. Collect images of license plates of vehicles from various sources like google images, Kaggle, GitHub, etc. and form a dataset.
2. The pandas and NumPy libraries are used to analyse the data set and pre-process it.
3. The scikit learn library is used to scale the data and fit it into the model.
4. The Convolutional Neural Network (CNN) algorithm will help us in pre-processing the images to identify the license plates in the pictures.
5. OpenCV and Pandas will be used in order to detect the green color of the electric vehicles based on the closest RGB values.

Future Scope: The scope of this project is vast as the era of vehicles run by fuels is slowly dying and people have started to prefer using electric vehicles.

With further advancements made in the technology, the need for a system to analyse the existing and upcoming changes would be necessary. The proposed system can be analysed by various different kinds of authorities as well as be combined with new information to lead to meaningful insights.

Dataset: The dataset will contain a set of images of various different license plates, including those of traditional fuel vehicles as well as images of electric vehicles. The images will be collected from various sources like Google, Kaggle and other royalty free pages.

Applications: The project can be used for the following applications:

1. To help traffic control authorities identify vehicles causing traffic violations.
2. To provide access of the data to environmentalists to analyse impact of electric vehicles on environment.
3. To enable the government to monitor the increasing number of electric vehicles on the roads.

Expected Outcome: A working model that determines if the vehicle is electric or not given an image of license plate as input.

Conclusion:

In this paper, we have proposed a system for detection of electric vehicles by detecting their license plates. We have included the step-by-step objectives and methodologies we would like to use and the expected results.

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