

Title: Car make and model recognition using convolutional neural network: fine-tune AlexNet architecture

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Abstract: Artificial intelligence (AI) has significantly contributed to car make and model recognition in this current era of intelligent technology. By using AI, it is much easier to identify car models from any picture or video. This paper introduces a new model by fine-tuning the AlexNet architecture to determine the car model from images. First of all, our car image dataset has been created. Some of these images were taken by us, and others were taken from the website of the car connection. Then we cleaned all the unwanted images for better performance. Our dataset has ten classes containing 5,000 car images split into train and test data. After that, we augmented our data with random flip, rotation, and zoom to reduce overfitting. Finally, we used a pre-trained convolutional neural network (CNN) model AlexNet architecture. We fine-tuned AlexNet (FT-AlexNet) by adding three extra layers for better classification and compared it with the original AlexNet. To measure the performance of these models, accuracy, precision, recall, and F1-score were used. The results show that fine-tune AlexNet architecture outperforms the original AlexNet architecture. The results prove that recognition accuracy has increased due to our improvement approach.

Keywords: AlexNet; Car model recognition; Convolutional neural network; Deep learning; Fine tuned-AlexNet

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