Deep Neural Network Approach for Navigation of Autonomous Vehicles

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Abstract : Ever since the DARPA challenge on autonomous vehicles in 2005, there has been a lot of buzz about 'Autonomous Vehicles' amongst the major tech giants such as Google, Uber, and Tesla. Numerous approaches have been adopted to solve this problem, which can have a long-lasting impact on mankind. In this paper, we have used Deep Learning techniques and TensorFlow framework with the goal of building a neural network model to predict (speed, acceleration, steering angle, and brake) features needed for navigation of autonomous vehicles. The Deep Neural Network has been trained on images and sensor data obtained from the comma.ai dataset. A heatmap was used to check for correlation among the features, and finally, four important features were selected. This was a multivariate regression problem. The final model had five convolutional layers, followed by five dense layers. Finally, the calculated values were tested against the labeled data, where the mean squared error was used as a performance metric.

Keywords : autonomous vehicles, deep learning, computer vision, artificial intelligence