Universiti Malaysia Pahang Autonomous Shuttle Development: Lane Classification Analysis Using Convolutional Neural Network (CNN)

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Abstract In recent years, the widespread adoption of autonomous vehicle, advanced driver assistant systems (ADAS) have acquired great interests as it provides safe and better driving by automating, adapting, and enhancing the driving experience. Road accidents can be avoided with the identification of various road infrastructures such as merging or splitting lanes as well as ending lanes must be well detected, providing a driver with a more convenient and safe intelligent function. However, the image for lane detection failed to be detected due to the visibility of image is affected because it may consist of noise, occlusion, undesired background blur and the image pixels. To predict the lane markers on road pavement correctly, a robust lane classification system using deep learning approach requires guidance so that it can detect significantly. Four significant operations involve in developing the system which are data acquisition, data pre-processing, data training and data testing. In this study, an improved classification algorithm using deep learning specifically convolutional neural network is used to detect the lane markers. The big dataset consists of 5000 images. It is distributed into are 4000 images as training data, 700 images as validation data and 300 images as testing data respectively. For the evaluation of lane detection system, the evaluation metrics are in terms of accuracy, false positive (FP) and false negative (FN). The accuracy of the lane classification system network is 91.97%.

Keywords Machine learning · Convolutional Neural Network · Lane classification

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