Driving Event Detection using 1D CNN

Potchara Vinitwattanakoon[1][*] Ekarat Rattagan[2]

Abstract – This study explore the use of 1D Convolution Neural Network (CNN) to predict occurred driving event from motion sensor data recorded by mounted smartphone inside a moving car. Contrary to most state-of-the-art algorithm for Time Series Classification (TSC) which use a 2D CNN architecture such as ResNet or FCN that often require a large amount of training data, a compact 1D CNN could have an advantage over 2D CNN where the labeled training data is scarce due to its less complexity in term of model architecture which is what this study want to explore. Since deep learning algorithm often require a large amount of datasets during training process, when dealing with the small datasets, the data augmentation is one of the method to increase the availability of training data and could help improve the performance of the algorithm, so this study will also explore, implement, and evaluate the use of data augmentation that is applied in the preprocessing step.

Keywords: Time series classification, Deep learning, Convolution neural network, Driving event detection, Motion sensor data, Data augmentation

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[*]Corresponding author. E-mail: potchara.vin@stu.nida.ac.th

[1]Graduate Students at Business Analytics and Data Science Graduate School of Applied Statistics National Institute of Development Administration

[2]Assistant Professor Dr. at Business Analytics and Data Science Graduate School of Applied Statistics National Institute of Development Administration

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