

Abstract

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Robustness to noise test for the machine learning model of neurology problems

Cerebral Vasospasm (CV) is a narrowing of the blood vessels in the human brain. Transcranial Doppler (TCD) is a noninvasive device and can be used for diagnosis of various brain diseases and CV detection. TCD signals can be contaminated with noise from power line and electrodes before using these signals in signal processing steps. The goal of this study is to evaluate the CV detection model accuracy against the noise. Time-frequency feature extraction was used as a technique to enhance the detection accuracy and efficiency. In previous studies, we extracted CV and normal classifier model by using the combination of 12-time frequency features, but the results generated a moderate accuracy when examined in real-time [put a reference]. In this study, we test the robustness to noise of proposed model experiments were applied in real-time on the recorded TCD signal from the right and left middle cerebral artery (MCA) region of the brain of 160 subjects. The experimental results give us 87.5% sensitivity for CV. This percentage starts to decrease at 30% of signal to noise ratio (SNR), and 89% specificity for normal and this percentage starts to decrease at 60% of SNR.