**ABSTRACT** 

Sleep is one of the basic human needs. Sleep has some functions namely to

restore energy, refresh the brain, improve immune function to the body. Sleep analysis

is often used to identify sleep-related human health. In many cases sleep disorders may

cause particular diseases. One approach to detect sleep disorders is by investigating

the stages of human sleep. Studies in detecting the stages of sleep can be done with

polysomnography. One alternative way to analyze sleep stages is to design a system

that aims to detect signal waves based on an electrocardiogram (ECG).

In this study, the writer designed a machine learning-based software used for the

classification of sleep stages in humans, where the state of wakefulness and awakening

during the sleep period became an indicator of each subject. From these conditions,

classification was carried out using Support Vector Machine (SVM) method and

optimized with Grid search. The public dataset available on physionet was used in this

study and involved 10 subjects to obtain the input signal. The ECG used as the input

signal came from three hotler channels (V5, CC5, V5R). One-subject-leave-out was

used as validation of classification performance. The evaluation metrics used as an

indicator in the successful performance of the method used were accuracy, precision,

recall.

Based on the results, the SVM method without optimization obtained average

accuracy of 82.60 %. Whereas the SVM optimized with grid search gained average

accuracy of 85.46 %, a precision of 84.05 % and a recall of 85.44 %, respectively.

Overall, the proposed model, SVM optimized with grid search, can be concluded to

have succeeded in improving the performance of machine learning algorithms.

Keywords: ECG, SVM, Grid Search, Sleep Stages, Classification.

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