ABSTRACT

Parkinson's disease is one of disease that attacks gradual nerve cell degeneration in the midbrain and regulates body movements. Until now Parkinson's disease has not been completely cured, but it can be prevented to reduce motor symptoms and slow down the disease to develop rapidly. Treatment is intended to make patients can move normally even though the Parkinson is still not successfully cured. This disease also cannot be diagnosed using medical images from brain scan technology, because the condition of the brain will look normal as healthy conditions, so the right method of scanning is needed to diagnose Parkinson's disease early.

This final project designed a system that can detect normal patients and patients diagnosed with Parkinson's disease. This study uses Vertical Ground Reaction Force (VGRF) sensor signal data obtained from the Physiobank database. The signal data processing consists of 5 stages. The first stage is data acquisition, the second stage is pre-processing by standardizing the lines on the input data signal. The next step is to extract the features using 2 methods, namely Wavelet Packet Decomposition (WPD) and Principal Component Analysis (PCA). The fourth stage, the results of feature extraction will be compressed using Compressive Sensing (CS) and the Orthogonal Matching Pursuit (OMP) algorithm is reconstructed. The last stage is classification using a Support Vector Machine (SVM), which will classify the signal data into 2 classes, namely Normal Patients and Patients diagnosed with Parkinson's Disease.

This study used 191 data, 96 training data and 95 test data, which were used in the WPD and PCA feature extraction scenarios combined with CS OMP reconstruction which was classified using SVM. The best WPD performance is achieved using several parameters, namely Mother Wavelet Daubechies (db1), level 4 decomposition and the Kernel classification used is Polynomial, resulting in an accuracy of 86.32% in 369 seconds. The addition of CS 80% on the WPD obtained an accuracy rate of 78.95% in 756 seconds. While the best performance of PCA using the Linear Kernel produces an accuracy of 73.68% in 342 seconds. The addition of CS 80% on PCA got an accuracy of 64.32% in 318 seconds.

Keywords: ***Parkinson, WPD, PCA, CS, SVM, MATLAB***