

ABSTRACT

Parkinson's is a disease that affects dopaminergic neurons in a part of the brain called the substantia nigra. Dopaminergic cells themselves are responsible for the production of dopamine, so when these cells degenerate, dopamine levels will also decrease. This makes communication between the substantia nigra and the corpus striatum less efficient. Then body movements become irregular. The purpose of this study is to provide another option to accurately detect the symptoms of Parkinson's disease at an early stage.

The method used in this study involves classifying digital images of written spiral line patterns and angled spirals of Parkinson's patients using CNN. The data used is image data written in circular spiral lines and angular spirals from 92 individuals consisting of 18 healthy people and 74 people with Parkinson's disease. The total image data is 736 image data, which is divided into a group of healthy people with 262 image data and a patient group with 474 image data.

In this study, a digital image classification system for writing circular and angular spiral lines with Parkinson's disease was created using the Convolutional Neural Network (CNN) and using the best architecture based on the highest accuracy by comparing the 4 architectures, namely VGG-16, MobileNet, AlexNet, and ResNet- 50. After that, testing is carried out based on predetermined test parameters, namely the optimizer, learning rate, and batch size. After testing, the best model is obtained using the Convolutional Neural Network (CNN) method using the MobileNet architecture, the RMSprop optimizer, the learning rate value is 0.0001, and the batch size 16 value produces an accuracy rate of 92%, precision 96%, recall 92%, and f-1 score 94%.

Keywords: *Convolutional Neural Network (CNN), Parkinson, Digital Image, Handwriting, Line Pattern.*