Optimasi Parameter Support Vector Machine menggunakan River Formation Dynamic pada Klasifikasi Brain Tumor

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Abstract

Brain tumor is a condition that can interfece with brain function due to abnormal cell growth in the brain. MRI is used as a diagnostic tool when a patient has a brain tumor. The images obtained through MRI will be analyzed by the doctor to determine the type of tumor. Therefore, it is necessary to have a system that can classify tumor types based on MRI images. The image will be extracted using the HOG method, then classified using SVM. SVM performance can be improved by optimizing its parameters. This research develops a system that uses a novel combination, the SVM with the River Formation Dynamic (RFD) algorithm. RFD is used to optimize the parameter of SVM, i. e., C and gamma. The main idea behind RFD is to mimic the movement of water droplets traveling from high to low places. This study compares the accuracy of SVM with the accuracy of SVM-RFD. The result is that SVM-RFD provides the better accuracy than only using SVM. The SVM accuracy result is 74.37%. When compared to SVM-RFD, the accuracy improved by 13.19% to 87.56%. Further work will be carried out on the implementation of RFD on other SVM parameters to find other parameter combinations that can improve the accuracy of SVM. Future work will implement RFD on other SVM parameters to find other parameter combinations that can improve SVM accuracy.

Keywords: brain tumor, nature inspired algorithm, support vector machine, river formation dynamic, histogram of oriented gradient