ABSTRACT

Glioma is one of the most common types of brain tumors. Patients with glioma generally experience frequent recurrence and resistant to therapy. This causes glioma patients to have a low survival rate, especially in cases of glioma with a high grade of malignancy such as glioblastoma multiforme (GBM). GBM patients have a median survival of about 10-14 months while patients with a lower grade of malignancy such as lower-grade glioma have a median survival of about 5 years. Doctors will perform a biopsy and observation to determine the malignancy grade of the glioma. However, observation by doctors is prone to errors. In this study, Multilayer Perceptron will be optimized by Genetic Algorithm to improve accuracy in classifying glioma grade. The dataset obtained from the UCI machine learning repository represents gene mutation based on observation results. Genetic Algorithm optimizes the hyperparameter of Multilayer Perceptron to improve the accuracy. The method's performance is measured using a confusion matrix. The results show that the Genetic Algorithm managed to slightly improve the accuracy of the Multilayer Perceptron in classifying glioma grade. Multilayer Perceptron with Genetic Algorithm achieved an accuracy of 91% while Multilayer Perceptron without optimization achieved 89.5%. These study results potentially assist doctors in determining the grade of glioma based on their observation results which could reduce the possibility of errors.

Keywords—Machine Learning, Glioma, Multilayer Percep- tron, Genetic Algorithm, Optimization, Confusion Matrix