ABSTRACT

Mental disorders are a growing health issue with complex diagnoses due to the possibility of more than one disorder occurring in the same individual, requiring a multi-label classification method capable of handling more than one label simultaneously. This study used 345 medical records of mental disorder patients at RSUD dr. Loekmono Hadi Kudus, obtained through purposive sampling, with four diagnostic labels: Schizophrenia, Schizoafective Disorder, Bipolar Disorder, and Depressive Episode with predictor variables represented by clinical symptom data documented in patients' medical treatment records. The data was divided using 60:40 train-test split scheme, where the training data was used to build the model and the test data was used to evaluate the classification performance. The multi-label classification method used was Weighted Multi-Label K-Nearest Neighbor (Weighted ML-KNN), which is a method that applies weighted to ML-KNN. The distance was calculated using Gower's distance because the variables used were categorical. The k parameter represents the number of closest neighbors form the test data, while the σ parameters serves as a weighted correction factor to control the influence of the distance distribution between data so that the contribution of closer neighbors becomes more dominant. Testing was carried out on several combination of $k = 10$ and σ = 0,0001 produces the best performance. Compared to the ML-KNN method, Weighted ML-KNN is able to reduce the frequency of prediction errors as indicated by a Hamming Loss value of 16,67%, which is lower than the Hamming Loss in ML-KNN 17,93%. In addition, Weighted ML-KNN also produced higher precision, recall, and f1-score values. These results indicate that the application of weighted in ML-KNN is effective in improving multi-label classification performance, particularly in handling the complexity of diagnosis and label imbalance in mental disorder data.

Keywords: Mental Disorders, Multi-label Classification, ML-KNN, Weighted ML-KNN, Gower's Distance