IMPLEMENTING A DRUG RECOMMENDATION SYSTEM FOR ACUTE PHARYNGITIS PATIENTS USING A RANDOM FOREST-BASED ENSEMBLE OF CLASSIFIER CHAINS ALGORITHM

(Case Study: Mlati II Community Health Center, Sleman)

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ABSTRACT

Acute pharyngitis is among the most common diagnoses at the Mlati II Community Health Center in Sleman, which recorded a high number of patient visits throughout 2024. The clinical challenge in managing this condition lies in the polypharmacy prescribing pattern, where patients often receive a combination of antibiotics and symptomatic therapies simultaneously. This complexity is further compounded by the characteristics of medical record data, which exhibit extreme disparities between common and rare drug classes. This study aims to develop a multi-label classification model using the Random Forest-based Ensemble of Classifier Chains (ECC) method to predict recommendations for eight drug types simultaneously. The research dataset comprises 128 patient visit records, processed using automated feature engineering, including the calculation of Body Mass Index (BMI) and Mean Arterial Pressure (MAP) to better represent patients' physical conditions. Model performance was evaluated on a separate test set using hyperparameter configurations optimized via Random Search. The test results showed that the model achieved an F_0.5 Score of 81.63% with an optimal threshold of 0.6. This performance indicates good generalization stability, although predictive accuracy for extreme minority labels, such as Ibuprofen, remains limited due to the scarcity of positive samples. The recommendation system has been implemented as a FastAPI-based web application prototype that serves as a second-opinion tool for doctors, without replacing clinical discretion in final decision-making.

Keywords: Ensemble of Classifier Chains, Acute Pharyngitis, Multi-label Classification, Random Forest, Medical Records.