

Classification of Hospital Length of Stay for Typhoid Fever Patients Using the Support Vector Machine (SVM) Algorithm at Jember Klinik Plantation Hospital

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ABSTRACT

Typhoid fever remains one of the leading causes of hospitalization at Rumah Sakit Perkebunan Jember Klinik. Based on the 2025 report of the ten most common inpatient diseases, typhoid fever ranked first with 1,363 cases, accounting for more than 36% of all hospital admissions. The high incidence of typhoid fever and the variation in patients' length of stay highlight the need for an effective classification method to support hospital decision-making. This study aimed to classify the length of stay of hospitalized typhoid fever patients using the Support Vector Machine (SVM) algorithm with the Radial Basis Function (RBF) kernel. A quantitative approach was applied using secondary data obtained from the medical records of the hospitalized patients in 2025. The variables included fever, headache, muscle pain, nausea, vomiting, abdominal pain, diarrhea, constipation, anorexia, weakness, insomnia, decreased consciousness, relative bradycardia, and length of stay as the target class. The research involved data collection, data preprocessing, balancing data using undersampling and Edited Nearest Neighbours (ENN), determination of kernel type, classification, confusion matrix. The result indicated that the 50:50 undersampling ratio provided the best performance. Among the four SVM kernels evaluated classification and confusion-matrix evaluation, the Radial Basis Function (RBF) kernel achieved the highest results, with an accuracy of 86.70%, precision of 94.44%, recall of 77.98%, and an F1-Score of 85.43%. The findings indicated that the SVM algorithm with the RBF kernel is effective in classifying the length of stay of patients with typhoid fever.

Keywords: *Typhoid fever, Support Vector Machine, Undersampling, Length of Stay, Edited Nearest Neighbours (ENN), Data Mining.*