

ABSTRACT

The availability of inpatient beds affects service quality, operational efficiency and patient safety. Predicting the need for beds is needed to facilitate the management of inpatient units and help capacity planning to improve the quality of services. The model development aims to obtain the number of beds needed to meet the Bed Occupancy Rate of 80%. The dataset is data on inpatient visits at RSUD dr. R. Sosodoro Djatikoesoemo Bojonegoro from June 2019 to May 2024 totaling 88,751 data including dates, inpatient rooms, treatment classes, capacity, number of occupied beds, number of male and female patients. The models used are Support Vector Machine (SVM), Decision Tree (DT) and Random Forest (RF). In predicting the overall need for beds, the RF model has the smallest Mean Absolute Error (MAE) value, namely 1.25 compared to SVM 2.94 and DT 2.52. For predictions per room, the RF model has the smallest MAE value, namely 0.15 compared to SVM 5.39 and DT 0.20. Meanwhile, for predictions per treatment class, the RF model has the smallest MAE value, namely 0.15 compared to SVM 5.01 and DT 0.23. The difference in MAE values for SVM is quite high compared to DT and RF because SVM is more sensitive to outliers. There is a very low number of occupied beds, amounting to 70 on May 24, 2020, and a very high number of occupied beds, amounting to 531 on February 26, 2024, and March 20, 2024, which affects SVM performance. The model predicts the need for beds on July 1, 2025, will be 658 beds. This model is expected to help hospitals manage bed capacity more effectively and efficiently.

Keywords: hospital, inpatient beds, machine learning, prediction.