

# Penerapan Metode Peramalan berbasis Artificial Neural Network untuk Perencanaan Persediaan Material Pesawat B737-800 = Application of Artificial Neural Network-based Forecasting Methods for B737-800 Aircraft Material Inventory Planning

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## Abstrak

Perencanaan persediaan material pesawat adalah aspek penting dalam proses perawatan pesawat, guna meningkatkan efisiensi dan mengurangi biaya penyimpanan, perusahaan perlu melakukan peramalan berdasarkan data historis permintaan material. Studi ini diawali dengan klasifikasi material menggunakan sistem klasifikasi FSN, dimana 14 material penting teridentifikasi dalam kategori F. Selanjutnya, analisis permintaan terhadap 14 material tersebut menunjukkan bahwa semua memiliki karakteristik permintaan intermiten, yang merupakan tantangan dalam peramalan. Dalam upaya mengatasi tantangan ini, penelitian membandingkan beberapa metode peramalan yaitu Moving Average, Exponential Smoothing, Syntetos-Boylan Approximation (SBA), Long Short-Term Memory (LSTM), dan Gated Recurrent Unit (GRU). Hasil analisis menunjukkan bahwa metode berbasis Recurrent Neural Network (RNN), khususnya LSTM dan GRU, memberikan akurasi peramalan yang paling baik dibandingkan dengan metode lainnya. Hal ini menegaskan keefektifan Artificial Neural Network, khususnya arsitektur RNN, dalam menghadapi tantangan peramalan untuk permintaan material intermiten.

.....Aircraft material inventory planning is an important aspect in the aircraft maintenance process. In order to increase efficiency and reduce storage costs, companies need to forecast based on historical material demand data. This study begins with material classification using the FSN classification system, where 14 important materials are identified in category F. Furthermore, demand analysis for these 14 materials shows that all of them have intermittent demand characteristics, which is a challenge in forecasting. In an effort to overcome this challenge, research compares several forecasting methods, namely Moving Average, Exponential Smoothing, Syntetos-Boylan Approximation (SBA), Long Short-Term Memory (LSTM), and Gated Recurrent Unit (GRU). The analysis results show that Recurrent Neural Network (RNN) based methods, especially LSTM and GRU, provide the best forecasting accuracy compared to other methods. This confirms the effectiveness of Artificial Neural Networks, especially RNN architectures, in dealing with forecasting challenges for intermittent material demand.