عنوان مقاله:

Demand Forecasting Model for Pharmaceutical Products Using MachineLearning Techniques with Bayesian Hyperparameter Optimization

محل انتشار:

نهمین کنفرانس بین المللی مهندسی صنایع و سیستم ها (سال: 1402)

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نویسندگان:

Reza Shirazi Zadeh - *M.Sc, Department of Industrial Engineering, Yazd University*;

Hasan Hosseini Nasab - *Professor, Department of Industrial Engineering, Yazd University*;

Mohammad Bagher Fakhrzad - *Professor, Department of Industrial Engineering, Yazd University*;

خلاصه مقاله:

Demand forecasting is the basis of many planning activities in the supply chain. Pharmaceuticalindustry, which deal with human health, require the implementation of an effective demand forecastingmodel. Due to demand volatility, businesses find it challenging to forecast customer demand accuratelyusing traditional models. In this study, a comparative analysis is performed based on machine learningtechniques such as Support vector regression (SVR), Random forest (RF), Light gradient boostingmachine (LGBM), and Extreme gradient boosting (XGB) models for demand forecasting inpharmaceutical products. The effectiveness of machine learning models is greatly affected by choosingthe appropriate hyperparameter configuration. Therefore, Bayesian optimization (BO) algorithm withthe Gaussian process (GP) is combined with Time series cross-validation to determine the optimalcombination of model hyperparameters. The results show that the Extreme gradient boosting modeloutperforms the other forecasting models in terms of Root Mean Squared Error (RMSE), MeanAbsolute Error (MAE), and ۲ score. This method can effectively forecast future demand to improvepharmaceutical supply chain management

کلمات کلیدی:

Demand forecasting, Sales time series, Machine learning, Bayesian optimization,Pharmaceutical products

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