

Predicting Timely Delivery of Humanitarian Supplies Using Machine Learning Techniques

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Abstract : Efficient supply chains play an essential role in delivering humanitarian supplies and directly impact the success of public aid initiatives globally. Predicting the delivery status of these essential supplies in a timely manner is crucial. Therefore, this study explores the application of ensemble-learning approaches to predict whether humanitarian deliveries will be made on time, using a comprehensive case-study dataset provided by one of the largest international supplying organisation. We employed various machine learning methods, including AdaBoost, XGBoost, and Gradient Boosting, to develop our predictive model. Our findings demonstrate that ensemble algorithms achieved promising results, with F1 scores ranging from 0.90 to 0.98. These high accuracy levels indicate the robustness of ensemble-learning techniques in forecasting delivery status, potentially enabling more proactive and efficient supply chain management in global aid initiatives. The implications of this study suggest that integrating advanced predictive analytics can significantly enhance the reliability of supply chains, ensuring the timely delivery of critical commodities to those in need.

Keywords : humanitarian aids, supply chains, machine learning, delivery status

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