UNIVERSITI TEKNOLOGI MARA

PREDICTIVE ANALYTICS OF REGIONAL LOGISTIC DEMAND AT FM GLOBAL LOGISTICS (M) SDN BHD

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ABSTRACT

Inefficient outbound delivery planning at FM Global Logistics (M) Sdn Bhd, driven by manual Excel-based processes and limited regional demand visibility, results in suboptimal truck utilization, fragmented planning, and inconsistent resource allocation. This project addresses these challenges by developing a Business Intelligence (BI) solution that integrates predictive analytics to forecast regional logistics demand and recommend suitable truck sizes. Following the CRISP-DM methodology with an added planning phase, historical delivery data from January 2024 to June 2025, covering order dates, delivery dates, locations, quantities, weights, volumes M3, and truck types, was collected from the company's Warehouse Management System (WMS). Regional demand forecasting was conducted using ARIMA time series analysis across Central, East Coast, North, and South regions, achieving RMSE values of 236.91, 27.76, 88.42, and 99.20 respectively. For truck size classification, four algorithms were evaluated: Decision Tree, Random Forest, XGBoost, and Naïve Bayes. Random Forest demonstrated superior performance with accuracy ranging from 71.57% to 96.3% across regions, effectively capturing complex relationships between volume, urgency, seasonality, and weekly patterns. The predictive model was deployed through an interactive Power BI dashboard featuring five pages: Home, Outbound Delivery Analysis, Weekly Regional Demand Prediction, Regional Demand Truck Utilization, and Suitable Truck Size Prediction. Expert evaluation confirmed the dashboard's effectiveness, user satisfaction, and interface aesthetics, with experts noting its clarity in presenting demand trends and truck allocation recommendations. This project demonstrates that data-driven predictive analytics can transform manual logistics planning into proactive, efficient operations, with future potential to integrate real-time data streams and expand fleet optimization capabilities.