UNIVERSITI TEKNOLOGI MARA

FLOOD PREDICTION MODEL FOR KUALA TERENGGANU AREA USING PREDICTIVE ANALYTICS

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ABSTRACT

Flooding in Kuala Terengganu is a seasonal disaster that significantly disrupts lives, infrastructure, and economic activities, particularly during the Northeast Monsoon season. The current forecasting process at the Department of Irrigation and Drainage (JPS) Kuala Terengganu is limited by the lack of access to data from the Malaysia Meteorological Department (MET), insufficient manpower and technical expertise to build predictive models, and the absence of a local system to independently process and analyse data. To address these challenges, this project developed a localized flood prediction model using predictive analytics and presented the results through an interactive dashboard to support early warning and decision-making. The project followed the CRISP-DM methodology, which consists of phases including business understanding, data understanding, data preparation, modelling, evaluation, and deployment. An additional project planning phase was introduced at the beginning to ensure structured execution. The data collected ranged from January 2020 to December 2022 and included rainfall, evaporation, river water level, flood depth, and elevation, obtained from MET Malaysia, JPS, and TessaDEM. Three classification algorithms were tested: Decision Tree, Naïve Bayes, and Random Forest. The model aimed to classify flood occurrence into two categories: flood and no flood. Evaluation using a confusion matrix demonstrated that the Random Forest algorithm achieved the highest performance with accuracy of 98.04%. The final model was deployed in a Power BI dashboard designed for use by JPS, NADMA, and the Kuala Terengganu District Office, enabling real-time monitoring and timely alerts. This project demonstrates how predictive analytics can be effectively applied to support flood risk management and local disaster preparedness. Future enhancements may involve expanding coverage to additional districts and incorporating larger scale datasets and environmental variables to see more patterns.

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