

Predicting Oil Spills in Real-Time: A Machine Learning and AIS Data-Driven Approach

Authors : Tanmay Bisen, Aastha Shayla, Susham Biswas

Abstract : Oil spills from tankers can cause significant harm to the environment and local communities, as well as have economic consequences. Early predictions of oil spills can help to minimize these impacts. Our proposed system uses machine learning and neural networks to predict potential oil spills by monitoring data from ship Automatic Identification Systems (AIS). The model analyzes ship movements, speeds, and changes in direction to identify patterns that deviate from the norm and could indicate a potential spill. Our approach not only identifies anomalies but also predicts spills before they occur, providing early detection and mitigation measures. This can prevent or minimize damage to the reputation of the company responsible and the country where the spill takes place. The model's performance on the MV Wakashio oil spill provides insight into its ability to detect and respond to real-world oil spills, highlighting areas for improvement and further research.

Keywords : Anomaly Detection, Oil Spill Prediction, Machine Learning, Image Processing, Graph Neural Network (GNN)

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