FrostPredict: An Integrated Tool for Black-Ice Prediction in Skoda's Factory Parking Lots

Overview

In collaboration with Skoda, a FrostPredict tool was developed to forecast black-ice formation on roads within factory parking lots. The tool integrates IoT sensors, pyranometers, *and weather prediction algorithms with a decision tree classifier. The goal is to predict black-ice formation 3-4 hours in advance, with a remarkable 96% accuracy.*

Keywords

IoT sensors
pyranometers
weather prediction
decision tree
road safety
black-ice prediction

Situation

Skoda faced a critical road safety issue in their factory parking lots during winter due to black-ice formation. The challenge was to accurately predict the occurrence of black-ice based on real-time and future weather conditions so that preemptive actions could be taken to maintain road safety.

Requirements

Combine IoT sensors, pyranometers, and weather prediction data into a single platform.

Develop a decision tree classifier capable of predicting black-ice formation 3-4 hours in advance.

Achieve high accuracy in prediction to ensure the effectiveness of preemptive road safety measures.

Solution

The FrostPredict tool was developed, incorporating IoT sensors, pyranometers, and weather prediction algorithms. A temporal fusion transformer together with gradient boosting classifier was implemented that could predict black-ice formation with an impressive 96% accuracy. Although not yet deployed, the tool has shown promising results and is slated for comprehensive testing this coming winter.

Benefits and Results

- Achieved 96% accuracy in predicting black-ice formation, offering ample lead time for preventive actions.

- Integration of multiple data sources into one platform provides a comprehensive approach to tackling the road safety issue.

- The tool, once deployed, is expected to significantly improve road safety within Skoda's factory parking lots.

- The FrostPredict tool represents an innovative approach to leveraging technology for road safety, and it may find applications in other contexts requiring timely weather-related predictions.

- A successful winter test could serve as a case study for similar safety initiatives across different organizations or public spaces.