

Prediction of Embankment Fires at Railway Infrastructure Using Machine Learning, Geospatial Data and VIIRS Remote Sensing Imagery

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Abstract : In view of the ongoing climate change and global warming, fires along railways in Germany are occurring more frequently, with sometimes massive consequences for railway operations and affected railroad infrastructure. In the absence of systematic studies within the infrastructure network of German Rail, little is known about the causes of such embankment fires. Since a further increase in these hazards is to be expected in the near future, there is a need for a sound knowledge of triggers and drivers for embankment fires as well as methodical knowledge of prediction tools. Two predictable future trends speak for the increasing relevance of the topic: through the intensification of the use of rail for passenger and freight transport (e.g.: doubling of annual passenger numbers by 2030, compared to 2019), there will be more rail traffic and also more maintenance and construction work on the railways. This research project approach uses satellite data to identify historical embankment fires along rail network infrastructure. The team links data from these fires with infrastructure and weather data and trains a machine-learning model with the aim of predicting fire hazards on sections of the track. Companies reflect on the results and use them on a pilot basis in precautionary measures.

Keywords : embankment fires, railway maintenance, machine learning, remote sensing, VIIRS data

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