



ABSTRACT

Title

Integrating Digital Surface Model for Flood Risk Assessment of Railway Networks in Thailand

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Abstract

In Thailand, recurrent and intense rainfall leads to significant flooding, posing serious threats to the nation's infrastructure, including its railway system. This research focuses on evaluating area-based risk factors contributing to railway track flooding, integrating advanced computer vision techniques to enhance the precision of flood risk assessments. Several critical factors were identified for comprehensive analysis: average total rainfall during the rainy season, waterway density, land use patterns, slope, and elevation. The study employed Digital Surface Model (DSM) and flooding simulation to meticulously map the topography of flood-prone areas and the railway tracks' right of way. The DSM serves a dual purpose, illustrating the topography and aiding in the accurate prediction of flooding impacts on the railway tracks and their surrounding environments. This approach enables the generation of a detailed map, showcasing the likelihood of railway track flooding across different regions, while also capturing the potential damages to track structures under varying flooding conditions. The resulting data provides invaluable insights into the interplay between natural phenomena and human-made structures, highlighting the areas where the railway tracks obstruct natural water flow and where the drainage systems are inadequate. This study contributes significantly to the development of a robust flood risk management strategy, tailored specifically for Thailand's unique environmental conditions and infrastructural challenges. The findings highlight the potential of technology-driven solutions in mitigating the adverse impacts of natural disasters, ensuring the resilience and safety of railway operations in flood-prone regions. This work enriches the existing knowledge on flood risk management and offers actionable insights for safeguarding critical infrastructure, advocating for sustainable and resilient development practices in regions affected by monsoons.

List Relevant Conference Theme(s) below

Cutting-edge railway technology (AI, big data, intelligent construction, etc.)

Rail infrastructure design, construction, health monitoring and maintenance

Dynamic interaction of rail vehicles, track, and infrastructures (bridge/tunnel/subgrade) systems