

TOP TEN

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A tool for risk monitoring of vehicle remote operation

This study introduces a dynamic Bayesian network (BN)-based tool designed for continuous operational risk assessment and monitoring of vehicle remote operation, emphasising its potential applicability across diverse transportation sectors equipped with incident databases. Motivated by the relatively limited studies to operational risk monitoring in the context of future autonomous and remotely operated vehicles, this research highlights the significance of such tools and their invaluable utility in constructing and perpetually updating risk models based on real-time incident data.

The approach combines a suite of tools, encompassing a user-friendly Graphical User Interface (GUI), a versatile programming language, specialised BN packages, and diagramming software, ultimately automating the development of BN risk models. To mitigate computational complexities associated with large BN models, the methodology employs Noisy-OR gates.

The study outlines a five-step methodology, culminating in the creation of the proposed tool, with each step dedicated to a specific task: data extraction, probability calculation, BN modelling, generating inference, and GUI and visualisations. To execute these steps, a programming script is developed, which automates the methodology, enabling real-time BN development and continuous risk monitoring. The script operates in the background at specified intervals, ensuring that risk event visualisations remain up-to-date. The methodology has been demonstrated in the study by developing a risk monitoring tool for ship remote pilotage operation.

