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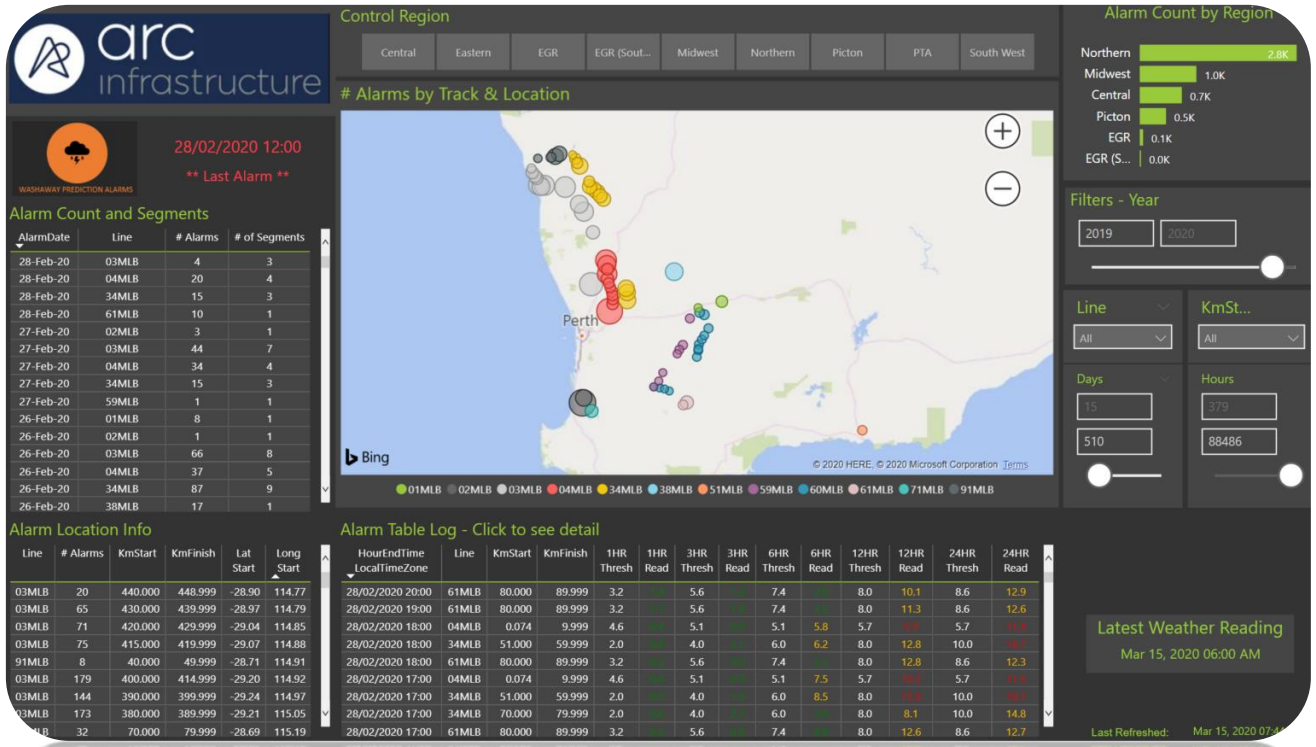
Case Study

Rail Washaway Prediction

arc infrastructure



- Analysis of rainfall patterns proved a predictability of ~93% for historical washaway events
- Realtime processing of current rainfall data should result in the same predictability for future washaways.

Overview

Derailments cost Arc Infrastructure approximately $2M per annum and are a key risk to the safety of Arc employees, rail operators and the public

One preventable cause of derailment is degraded track condition, when the rail formation underneath the track is displaced due to abnormal or intense rainfall events (Washaway), risking derailment as the train passes over the compromised section.

Innovation workshops theorised it might be possible to predict these derailments through the analysis of past washway events and rainfall patterns.

Interfuze were engaged to test this hypothesis through a proof of concept that could go on to form a production ready solution should the theory prove viable.

The Client

Arc Infrastructure manages and operates 5,500 kilometres of rail network across the South West of Western Australia.

As the only freight rail network in the southern half of Western Australia, our network is vital to providing access to the eastern states of Australia and overseas markets through the region's six government-owned ports.

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The Challenge

The challenge with this solution was to understand and identify high risk locations for track washaways, find and collect relevant data and then develop novel analysis techniques that would allow us to predict and/or detect washaways either prior to, or as they occur.

The Approach

The project went through an extensive data analytics and relationship mapping exercise to understand the relationships between Rainfall, Geography and Historical Track Washaway Events.

The team then correlated every weather station with a flood event and rail track km marks, which enabled the establishment of a base set of thresholds for each track segment on the network and the estimated impact that rainfall at certain locations had on those track sections.

Once this was established the project team were able to build a Washaway prediction engine that could learn changing thresholds over time, monitor incoming rainfall, predict at-risk sections and generate alarms as an early warning tool.

The Solution

The solution monitors these incoming weather station readings and based on the threshold logic and alerts on track sections that are at risk of Washaways.

The solution monitors and can generate hourly segment alerts, hourly weather station alerts and is also scalable into GIS applications for use in conjunction with field data coming in from IoT devices.

For the initial proof of concept phase, visualization of these alerts is via PowerBI over an Azure SQL DB with alert push notifications via email distribution lists to relevant users

The Results

Interfuze delivered the proof of concept which is currently being productionized for operational use.

Arc Infrastructure can now proactively monitor weather events to notify and mitigate the risk to Rail Operators of traversing sections of rail that have experienced a Washaway.

This solution is developing into a foundational piece that will be scaled across other areas for monitoring and detection alerts.

"Interfuze did an outstanding job understanding a very complex business problem and then going on to develop and clearly communicate a solution with real value.

The generation of washaway alerts to operational teams marks a significant achievement toward risk mitigation and safety to rail operations across the Arc Infrastructure network."

Murray Cook

Chief Executive

Arc Infrastructure

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Think we can help solve your problem?

Reach out to Branden or Tim

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