## Datamining

Data mining of TMS data from Virgin West Coast trains

Business Challenge

Modern trains like the 'Pendelinos' used on the West Coast Line use extensive computer logging of data about the train's operational state. These records are made at intervals of as little as a fraction of a second and each train can generate millions of records each week.

The data is handled by a Train Management System (TMS) and consists of logs of each event or fault during a journey. In addition to the type of fault or event, the record contains details of the actual train, the data and time the fault was recorded, the carriage in which the fault was detected and values of various context variables describing the operational state of the train at the time.

Alstom was interested in ascertaining if data mining could be used to identify patterns in the TMS data that would indicate systemic operating faults as well as prediction of imminent faults on an individual train. The former would be used to inform the maintenance schedule whilst the latter would allow very expensive train failures to be avoided. The success of the approach relies on the development of tailor made data mining software tool that could be used by Alstom technical staff.
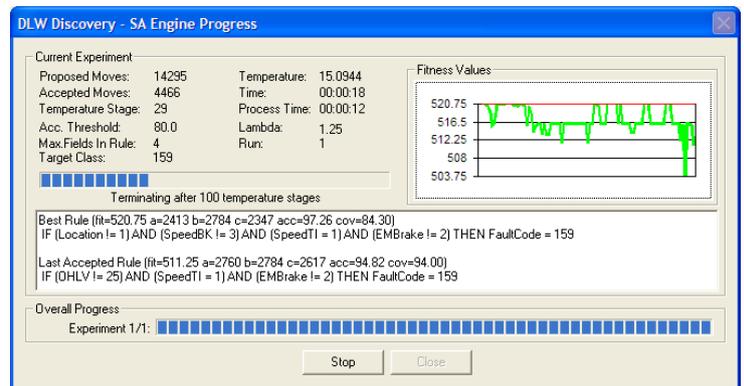

Mining of rules to accurately describe the train environment associated with a particular TMS event.

Our Solution & Expertise

Following successful extraction of patterns from the data, SYS Consulting experts Dr Graham Tattersall and Dr George Smith developed FaultExplorer, a statistical analysis tool that, even with the enormous data files generated by TMS, allows faults and anomalies to be rapidly identified.

Key features of FaultExplorer are its ability to automatically generate an English Language summary of a statistical rule that describes the operating conditions relevant to a particular type of fault. The system can also present "snap-shot" and temporal patterns of multi-dimensional fault conditions in the form of a graphical display that highlights particular operating problems.

Alstom technical staff were trained to use FaultExplorer as part of routine maintenance operations.
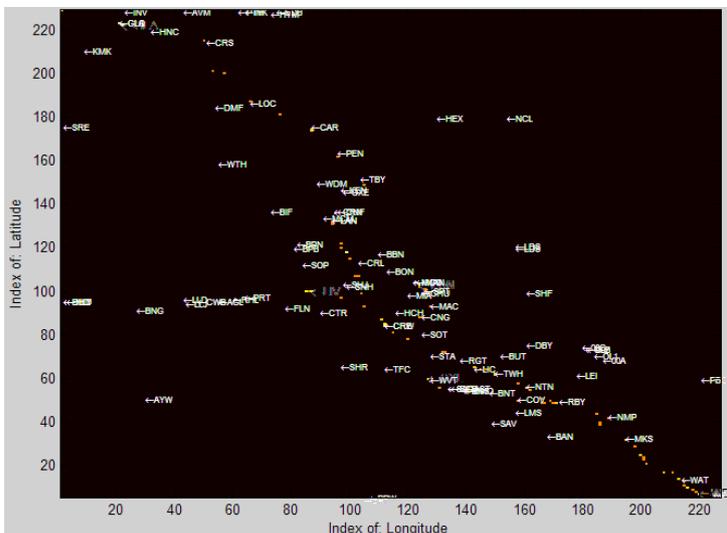
Geographical locations of a particular TMS event.

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