



Linear infrastructure efficiency improvement by automated learning and optimized predictive maintenance techniques

INFRALERT Deliverable D4.4

Summary Sheet

DELIVERABLE TITLE:

D4.4 Asset severity level predictor

WORK PACKAGE:

WP4. Alert management

- **T4.4** Implementing an asset severity level predictor
- **T4.5** Prioritisation and managing of alerts

Deliverable Leader:

Universidad de Sevilla

Contributing Partners:

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EXECUTIVE SUMMARY:

The INFRALERT project aims to develop an expert-based information system to support and automate linear asset infrastructure management from measurement to maintenance. For this purpose, one of the pillars of the project is WP4, aimed at the development of an alert management system. An alert is generated when the condition of an infrastructure asset crosses a threshold limit value defined by a standard in a specific forecasted scenario. The Alert System will analyse asset condition and operational information to provide alerts whenever the infrastructure reaches, or is close to reaching, a critical level in the present time or in the near future. Therefore, it will be able to combine the current and predicted asset condition with operational and historical maintenance data, to get information about the maintenance tasks that are necessary to avoid later severe degradation or mismatching of safety and/or comfort conditions. All this input information will be available from other WPs in the project. By means of data mining methodologies, this WP will generate a prioritised listing (ranked on severity level) corresponding to the alerts generated by all assets of a linear transport infrastructure, as well as the related historical failures and related historical maintenance interventions.

This deliverable, D4.4, reflects the most relevant details regarding the functionalities, setting and inputs/outputs of the software toolkit developed in tasks T4.4 “Implementing an asset’s alert level estimator” and T4.5 “Prioritisation and managing of alerts”, from work package 4: Alert management.

The mathematical and technical backgrounds, the toolkit is built on, are detailed in previous documents of this project. Thus, document D4.1 provided a general description of the relevant pieces of information (data) to accomplish the objectives of the work package as a part of the whole INFRALERT project; it also included a general description of the results, intended to be reached, corresponding to the predictions of maintenance alert at any prescribed time scenario together with the most probable maintenance intervention type recommended. Document D4.2 reflected, in a detailed manner, the multiplicity of methodologies used for generating maintenance alert predictions based on machine learning and

artificial intelligent techniques. Some preliminary results proved the adequacy of the data analytics tools finally chosen. The document contained predictions based on several well established techniques, corresponding to a real case of a road subnetwork administrated by Infraestruturas de Portugal (IP). The just previous document, D4.3, presented the final structure of the full automated artificial intelligent engine; it presented the approach developed for: a) predicting the maintenance interventions, to be carried out, on the interested asset of a linear transport infrastructure in forecasted scenarios and the probability of the estimate; b) the severity of those alert related to the expected values reached by the explicative features of the state condition of the different assets of the infrastructure; c) a global severity level associated to each alert prediction ; and d) a listing with the most probable maintenance intervention type associated to each alert.

This document, categorised as “*other*”, intends to be a guide to the “non-expert” user. It describes the main functionalities of the toolkit generated, initial settings, and the inputs which nourish the diverse integrated modules built-in.

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