

MICADO: INFRASTRUCTURE MAINTENANCE THROUGH MAPPING AND DATA

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Summary: ContextThe modernization and maintenance of railway lines require significant investments. Thus, optimizing costs in the context of opening up to competition in Europe is a major challenge. It is possible to contribute to this by moving from corrective/preventive maintenance to conditional maintenance, which consists of anticipating the condition of equipment in order to plan maintenance operations as best as possible.

Objectives of the MICADO project:

In this context, the MICADO project, which we are carrying out at PREDITIC as part of the activities of Ferrocampus (a French Railways Business Cluster), aims to limit the operating costs of regional railway lines by implementing conditional maintenance modules based on the data collected on the infrastructures. Beyond the financial gains, this makes it possible to reduce the environmental and commercial impact linked to preventive maintenance (emergency interventions, delays, traffic disruption).

Originality of the work carried out:

We analyze (Machine Learning) the data (rail and direct environment) that are made available to us by Hitachi (sensors, images/videos, Lidar) and GEOSAT (Lidar point clouds, semantic model). The MICADO project aims to deploy a demonstrator in a real situation and define a methodology that will be used in the implementation of the solution in other contexts. The specificity of the project lies in the use of a complete data set that will come from both data from sensors placed on a regular train and reference data. The analysis will not be carried out in real time but after transfer of the data to a dedicated server where they will be reconciled to make projections on the evolution of the infrastructure.

State of the art and obstacles

The limits of comparable solutions are in the data set they exploit and in the need to deploy a dedicated equipment. Examples include CANUPO from Cloudware, Vercator, The Cross Product, TopoDOT, Eurailscout, etc.

MICADO lies between the current solution with agents regularly going to the field for inspection and solutions requiring large deployments of equipment such as a dedicated train.

The main technical obstacle lies in the ability to collect, secure, reconcile and process a large mass of data collected on the fly by a regular train.

With regard to usage and regulatory obstacles, the MICADO project uses a regular train and the challenge of confirming the ability to embed dedicated devices has already been dealt with by Hitachi.

Organization of MICADO and contributions

MICADO is organized around three axes:

1. conduct simple statistical analyses on the collected data, calculate indicators, generate parameterized alerts.
2. perform advanced statistics to characterize the collected data and set up a methodology for the choice and implementation of the most suitable prediction models.
3. automatically build, from the available data, values ??(which we call pre-indicators) that could prove to be indicators in the context of the railway domain. Their usefulness/validity will then be validated (or not) with the experts.

Conclusion

We will deploy and evaluate The MICADO prototype in a real environment, the first target being a line close to the city Limoges in France.