Pantograph measurements – predictive maintenance at SBB CFF FFS

The pantograph that connects SBB vehicles with the overhead line is a crucial part of trains. Zühlke provides a machine learning-based solution to facilitate maintenance planning.

SBB CFF FFS

Benefits in a nutshell

- Planning efficiency and lower maintenance costs
- Automated inspection of the pantograph at shorter intervals without manual checks
- Computer-vision prediction of the date when the coal insert is to be replaced

High level of control

SBB inspects the thickness of the pantograph's coal insert at regular intervals. A service worker disables the overhead line for the inspection. This step must be coordinated and is time-consuming. The service worker climbs onto the roof of the train and measures the coal insert manually. They then enter the measurements into a system.

Regular inspections are necessary, as dents or cracks in the coal insert can cause serious issues. A high level of control is needed to be able to predict when the coal insert needs replacing. Overall, it's an expensive process that can be optimised.

Machine-learning based solution

Working closely with technical railway experts, a team of data scientists and software engineers from Zühlke are developing a machine-learning based solution to facilitate maintenance planning. They are building the software in an agile manner using Scrum, delivering working software increments after each sprint cycle.

Custom-built algorithm

As soon as a vehicle enters the service centre, an industrial camera system captures a picture of the pantograph. SBB and Zühlke have built a cloud solution to inspect these pictures. Components of the pantograph are detected with a machine learning model. A custom-built algorithm measures the profile of the coal insert. All the measurements are visible on a well-organised web application.

Tools: Data Analytics, Machine Learning, Predictive Maintenance, Deep Learning, AI, Software Engineering, Process Automation, Transport & Mobility, Scrum

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