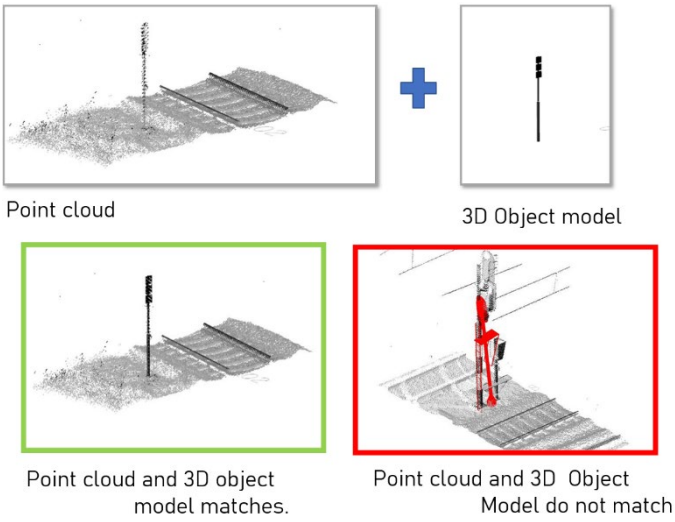
POINT CLOUD SEGMENTATION USING CONTEXT-BASED FEATURE ENGINEERING



The digitalization of railroad infrastructure is aimed at the improvement of maintenance and construction activities. Currently, inspections are done manually, with a domain expert classifying objects. This is a challenging task, considering the Netherlands has more than 3,400 km of railways that need to be inspected and maintained.

The research group (lectoraat) Ambient Intelligence collaborates with Strukton Rail to work with point clouds, which are sets of spatial data points captured by 3D scanning techniques such as lidar. These point clouds contain many million points of data, resulting in 3D representations of the railway environment. Point cloud data can be used to create machine learning models for segmentation: automatic classification and localization of objects in railway infrastructure. This task involves feature engineering amounting to various aspects of points data.

In this assignment, you have the opportunity to contribute directly to going beyond the state-of-the-art in applied research. You will become part of our research team as an active member with direct lines to our researchers and domain experts at Strukton Rail.

TASK DESCRIPTION

In this project, the aim is to investigate feature engineering techniques and their automation to develop models for automatic segmentation of point cloud data.

- Prepare a state-of-the-art overview for feature engineering for point cloud classification.
- Develop an algorithm for automatic feature extraction for point cloud classification.
- Empirically evaluate various segmentation algorithms as candidates for classification of the point cloud dataset.

PRACTICAL INFORMATION

- **Student profile:** HBO-ICT, Applied Computer Science, MSc computer science. The student must have basic knowledge of data science; experience with scikit-learn or a similar framework is preferable.
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