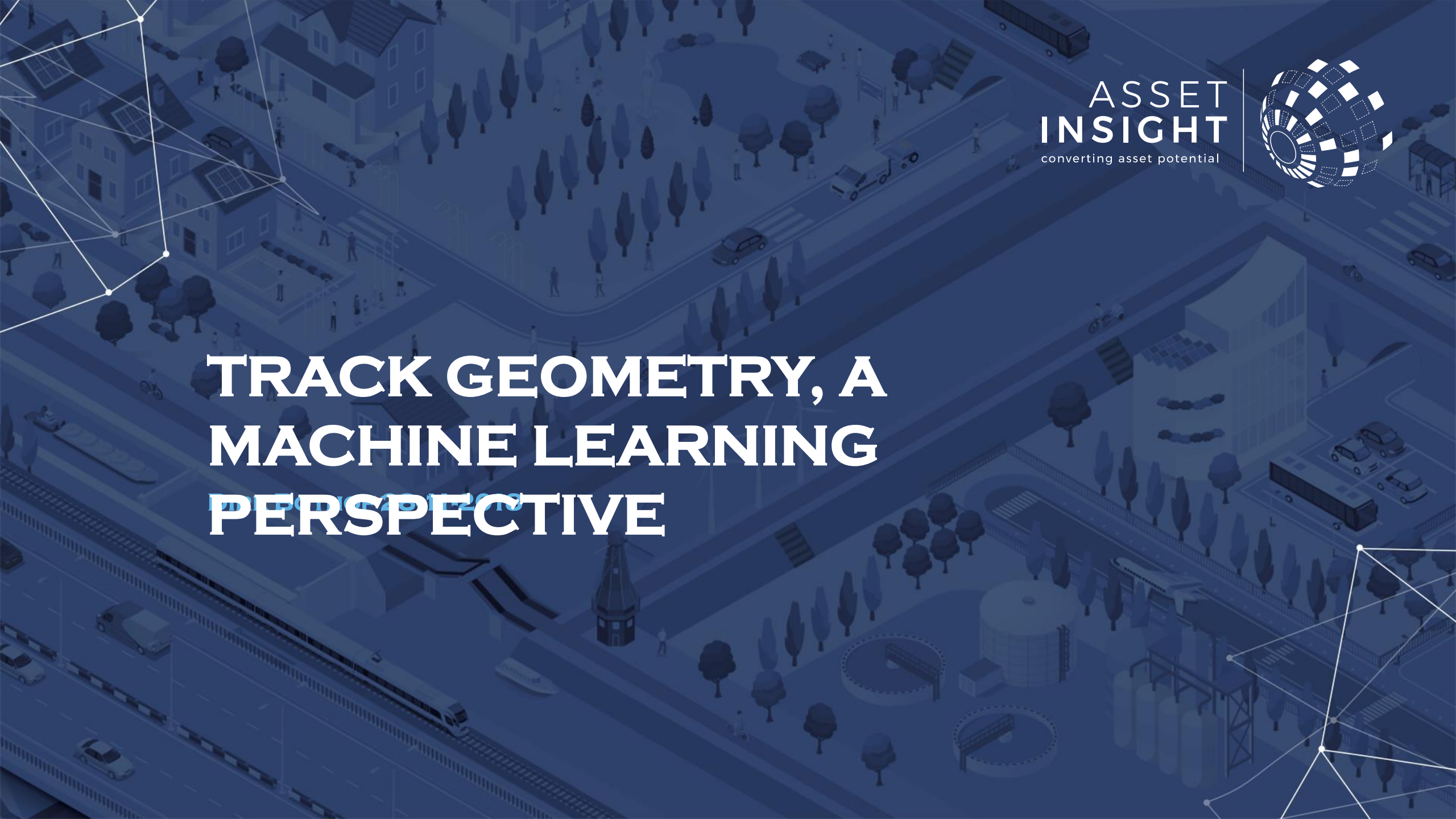
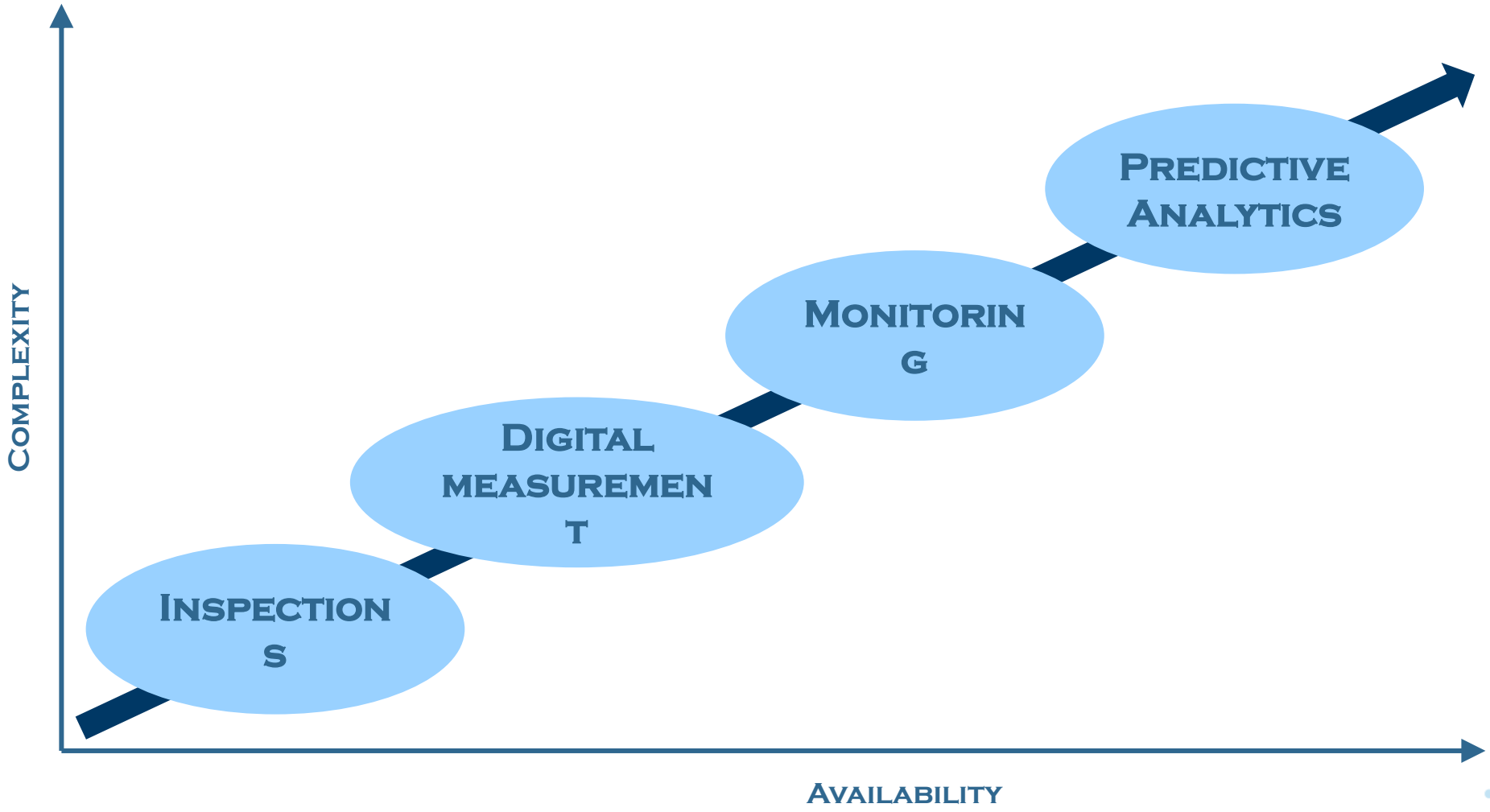


ASSET INSIGHT
converting asset potential

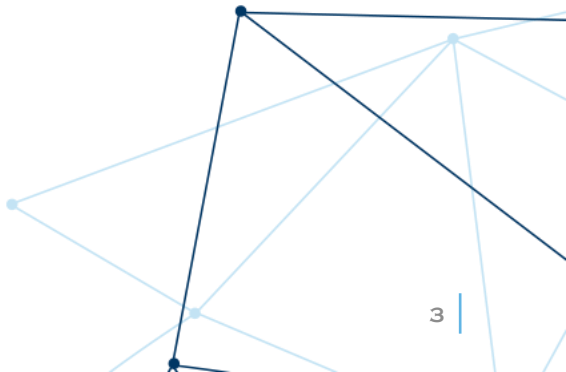
TRACK GEOMETRY, A MACHINE LEARNING PERSPECTIVE

ASSET.INSIGHT.



CHALLENGE

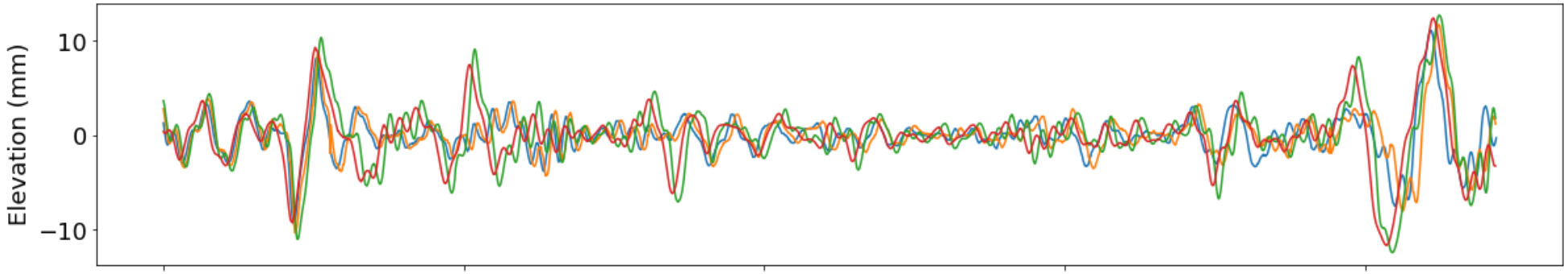
- Increasing loads, intensifying railroad traffic & reduced maintenance slots
- Increasing pressure on maintenance budgets
- Increased attention for track geometry and tamping
- Goal: decrease life cycle costs of track geometry maintenance



APPROACH

ASSET INSIGHT
converting asset potential

- Machine learning model to predict the future state of the track geometry
- Enabling just in time maintenance with known risks
- Lots of historic track geometry data available, but is it useful?



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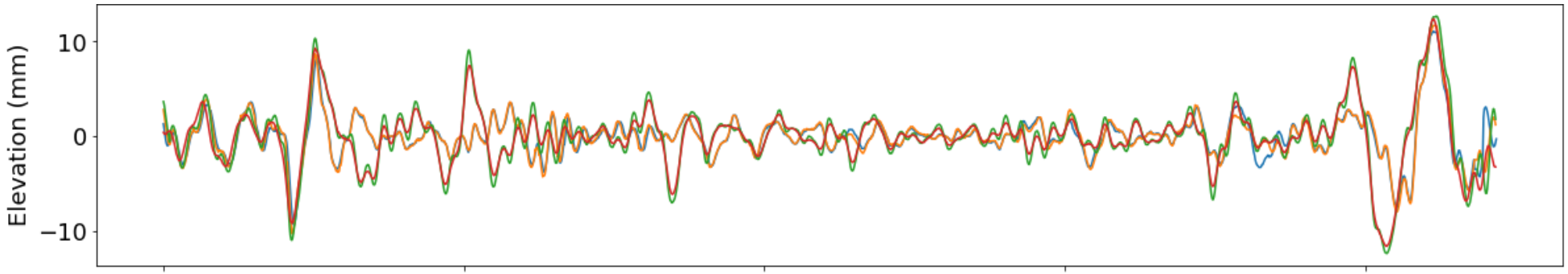

SOLUTION

- Nonlinear alignment of historic data
- Extracting historic maintenance data from track geometry signals
- Building a machine learning model

EXAMPLE

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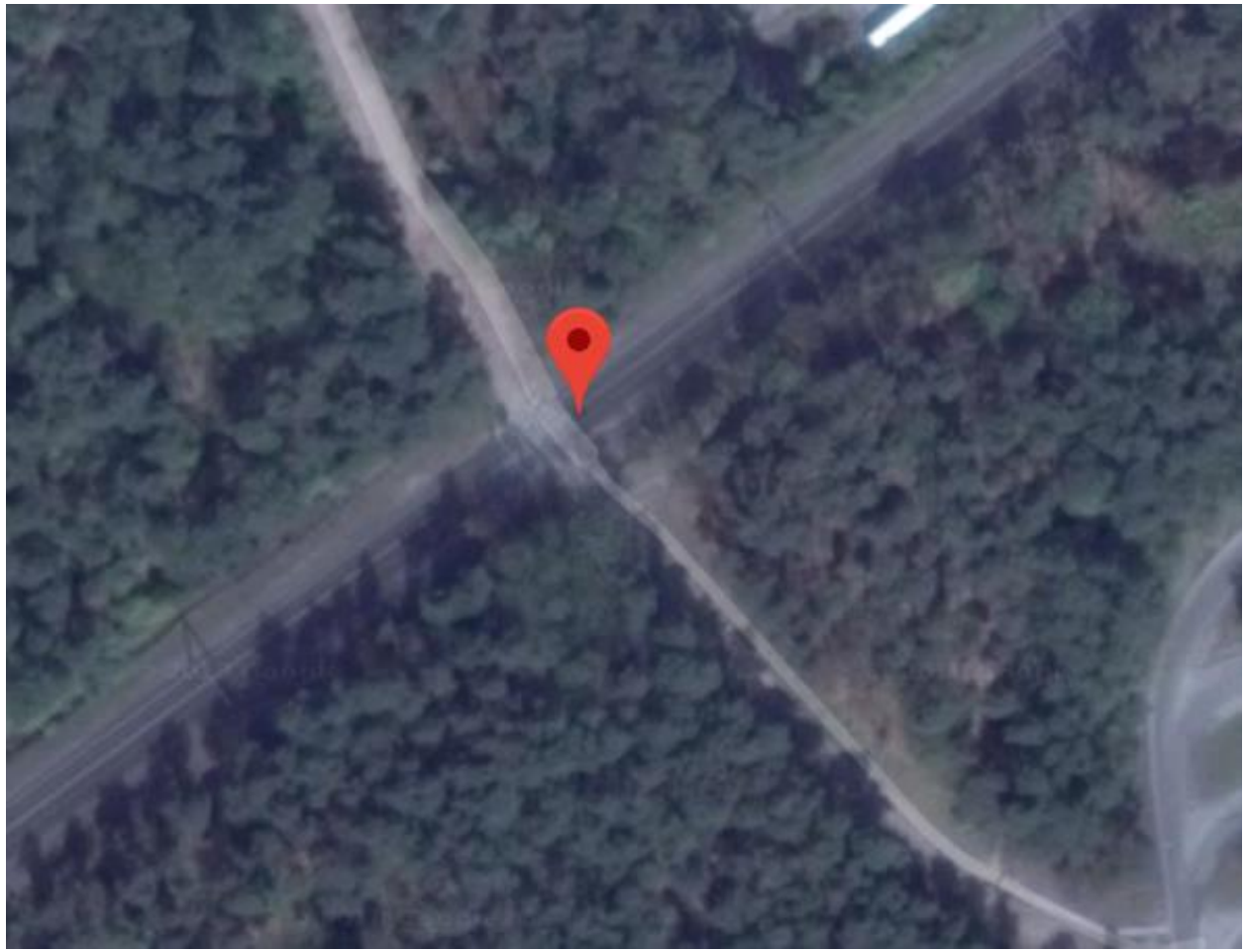
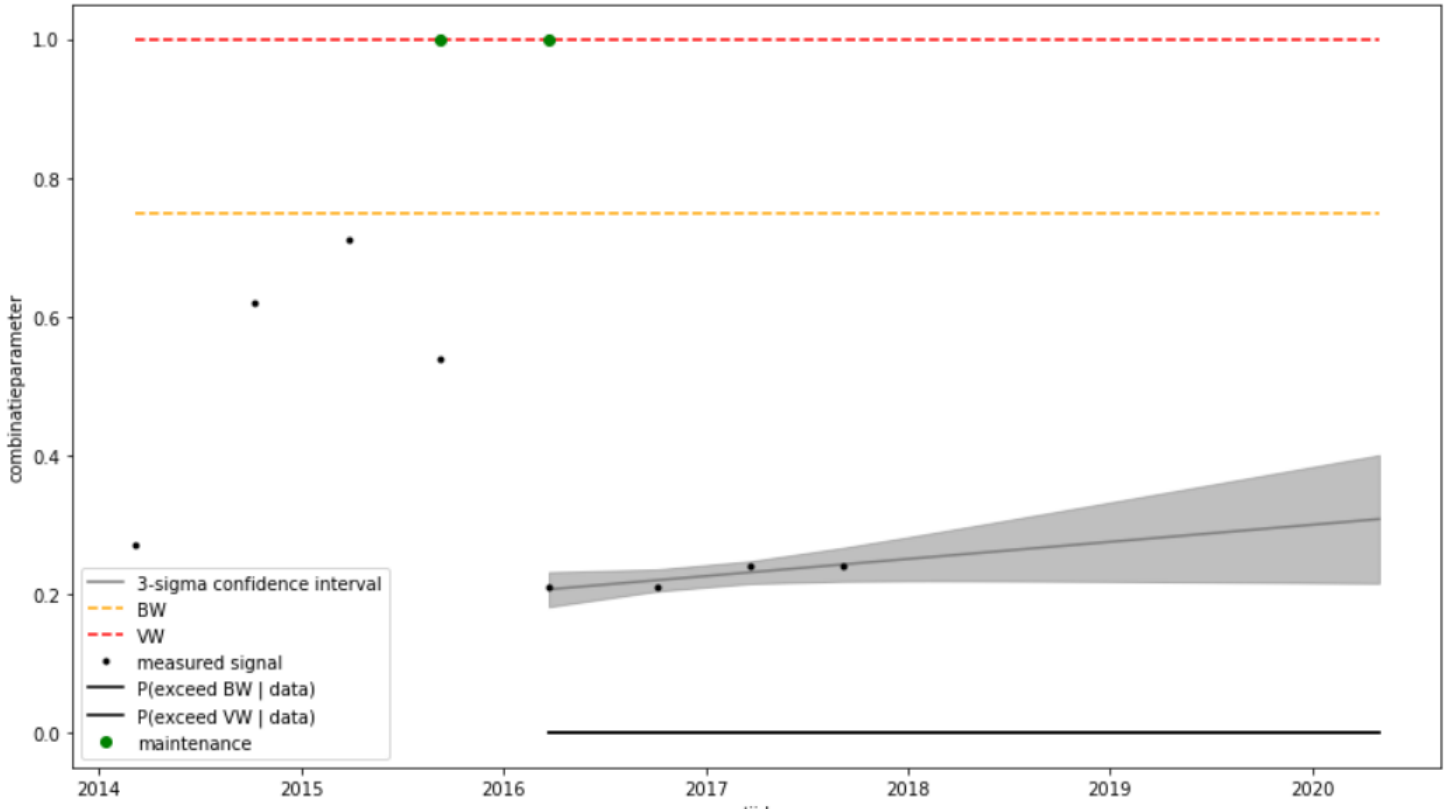
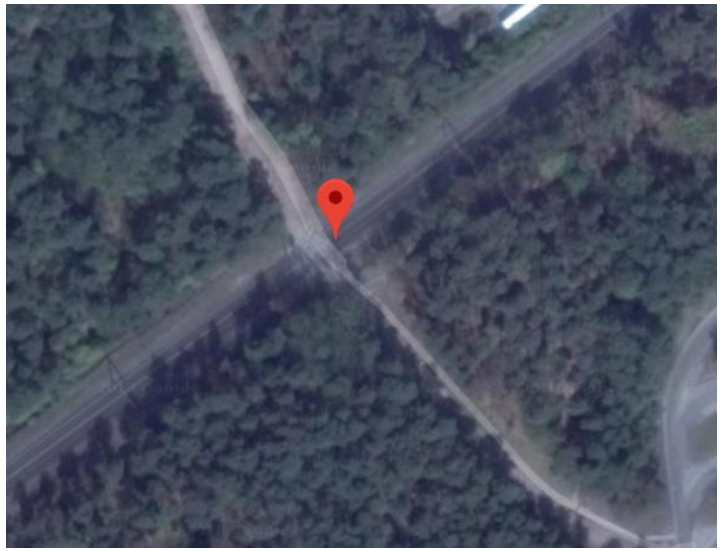
converting asset potential



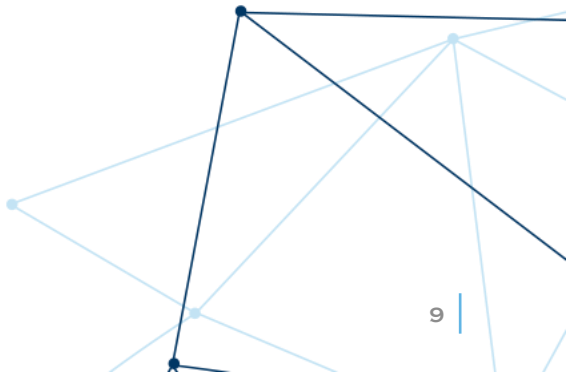
EXAMPLE


combinatieparameter
1.0
0.8
0.6
0.4
0.2
0.0
2014
2015
2016
2017
2018
2019
2020
3-sigma confidence interval
BW
VW
measured signal
P(exceed BW | data)
P(exceed VW | data)
maintenance



WHAT'S NEXT

- Pilot successful!
- Implementing the output in a linear asset management software package
- Numerous model improvements possible!
- Logistic optimisation of tamping



OTHER RAIL APPLICATIONS

ASSET INSIGHT
converting asset potential

- Machine learning has a massive potential in the domain of rail maintenance:
  - Predicting rolling contact fatigue (second model ready)
  - Predicting rail wear (second model ready)
  - High level disruption prediction (first model ready)
  - Image recognition for rail defects (first model in implementation phase)
  - Automated maintenance planning model (just an idea!)