



# Railway track fault detection with Artificial Intelligence

TAMÁS DEMUS

2023.07.18

# Motivation

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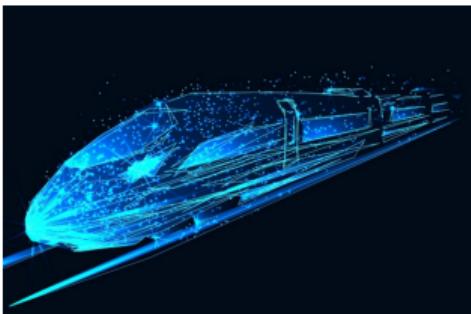


# Motivation



Interest in railway technology  
Desire for research  
Self education

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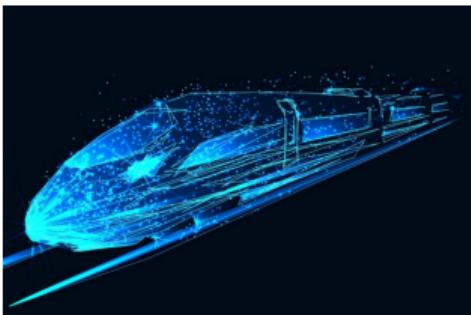


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Interest in railway technology  
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Interest in computer science  
AI studies

# Available results

# Available results

Modelling practice

- Kaggle dataset

- Deep neural network

- Limited data quality and quantity

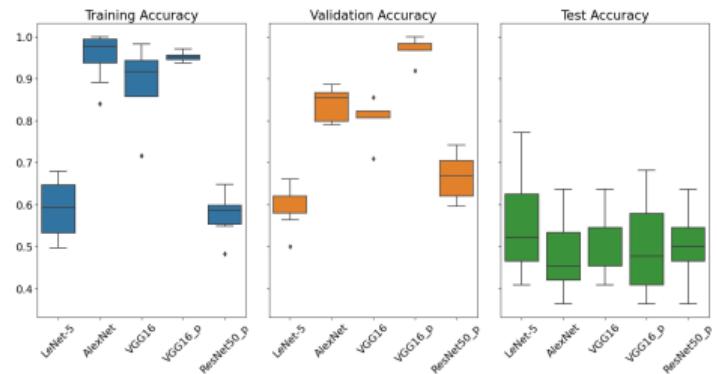
# Available results

Modelling practice

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# Available results

Modelling practice

Kaggle dataset

Deep neural network

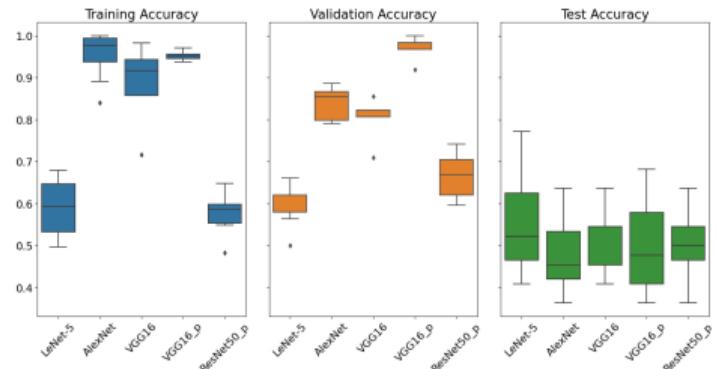
Limited data quality and quantity

Thesis work

Dataset from MÁV CRTI Ltd.

Reconstruction of rail images

Anomaly detection models



# Available results

Modelling practice

Kaggle dataset

Deep neural network

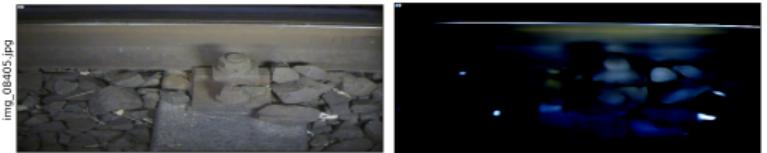
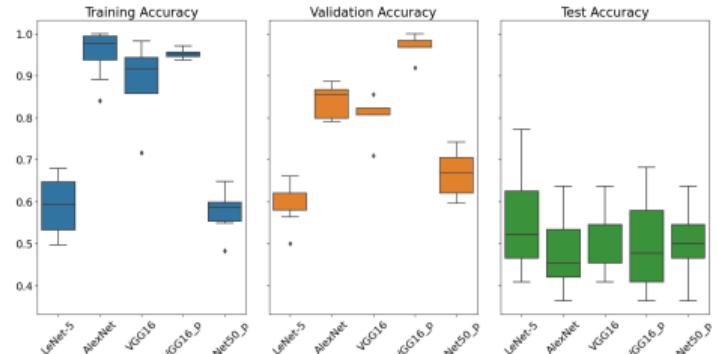
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Thesis work

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# Available results



Normal rail



Normal rail



Normal rail

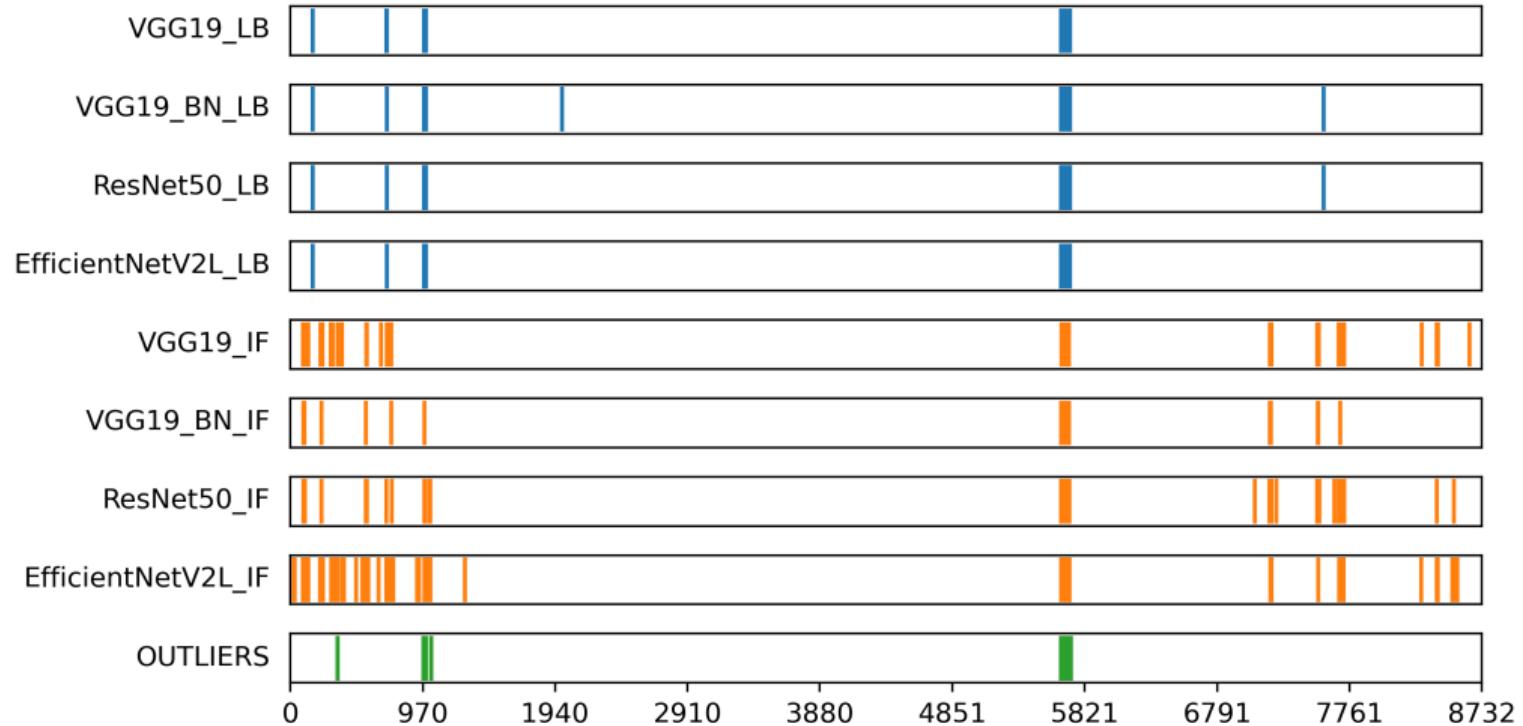


Rails covered with grass



Double rails

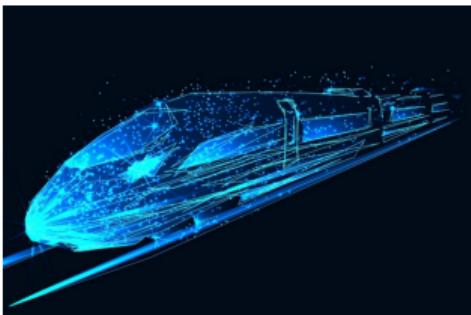
# Available results



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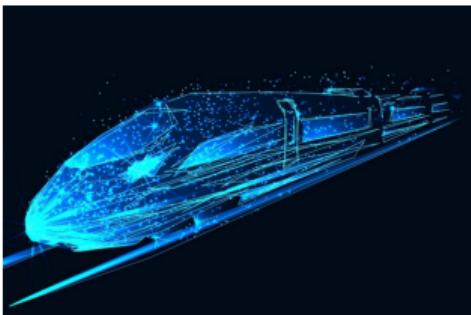


Interest in computer science  
AI studies

# Motivation



Interest in railway technology  
Desire for research  
Self education  
**Scientific workshop**

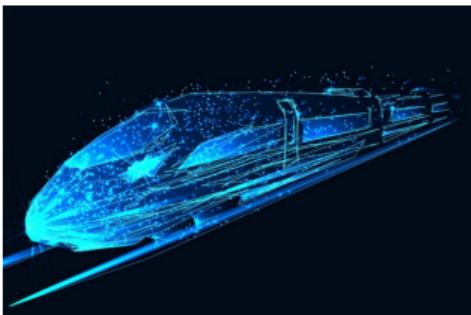


Interest in computer science  
AI studies

# Motivation



Interest in railway technology  
Desire for research  
Self education  
**Scientific workshop**

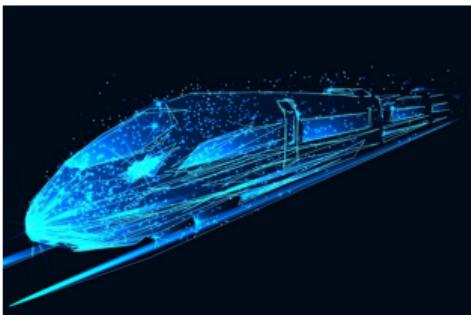


Interest in computer science  
AI studies  
**Research project**

# Motivation



Interest in railway technology  
Desire for research  
Self education  
**Scientific workshop**



Interest in computer science  
AI studies  
**Research project**  
**(Product development)**

## Next steps

# Next steps



## Next steps



Further models and model improvements  
Scientific publications  
Research project

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Further models and model improvements  
Scientific publications  
Research project

## Next steps

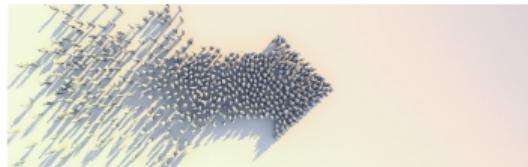


Further models and model improvements  
Scientific publications  
Research project



Provides video footage from rail inspections  
Possible real life application  
Joint project work

# Next steps



# Next steps



Identify project opportunities  
Search for contributors

# Next steps



Identify project opportunities  
Search for contributors



# Next steps



Identify project opportunities

Search for contributors

Proof of concept

Fit to MÁV CRTI Ltd. equipment

Limit failure type or location

Limit input data type (e.g.: no junctions)

Outcome

Research paper

Experience



# Department of Highway and Railway Engineering

# Department of Highway and Railway Engineering

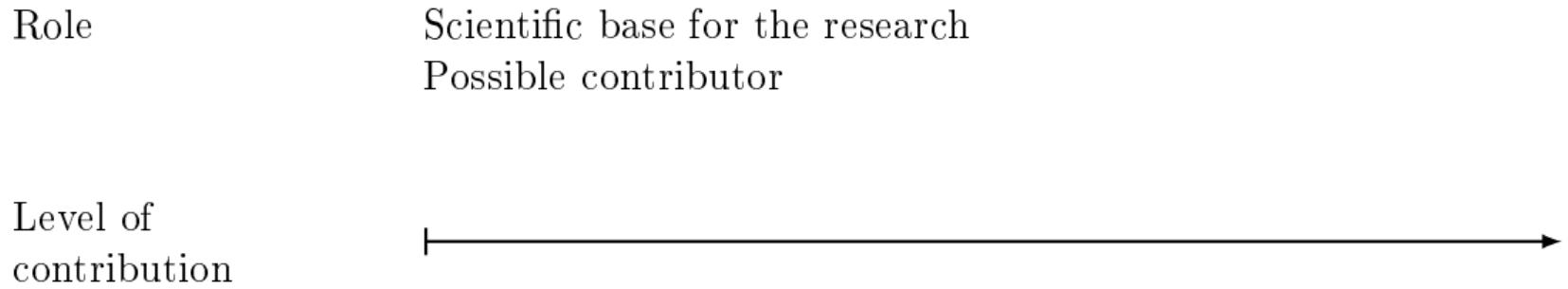
Role

# Department of Highway and Railway Engineering

Role

Scientific base for the research  
Possible contributor

# Department of Highway and Railway Engineering



Department of Highway and Railway Engineering

Role

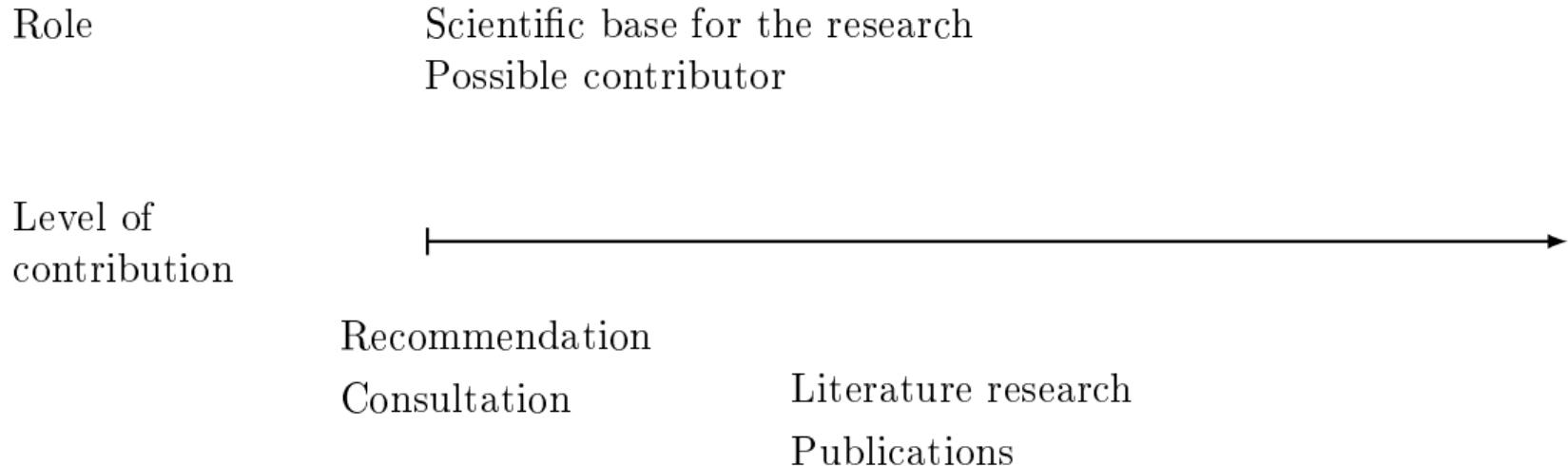
## Scientific base for the research Possible contributor

## Level of contribution

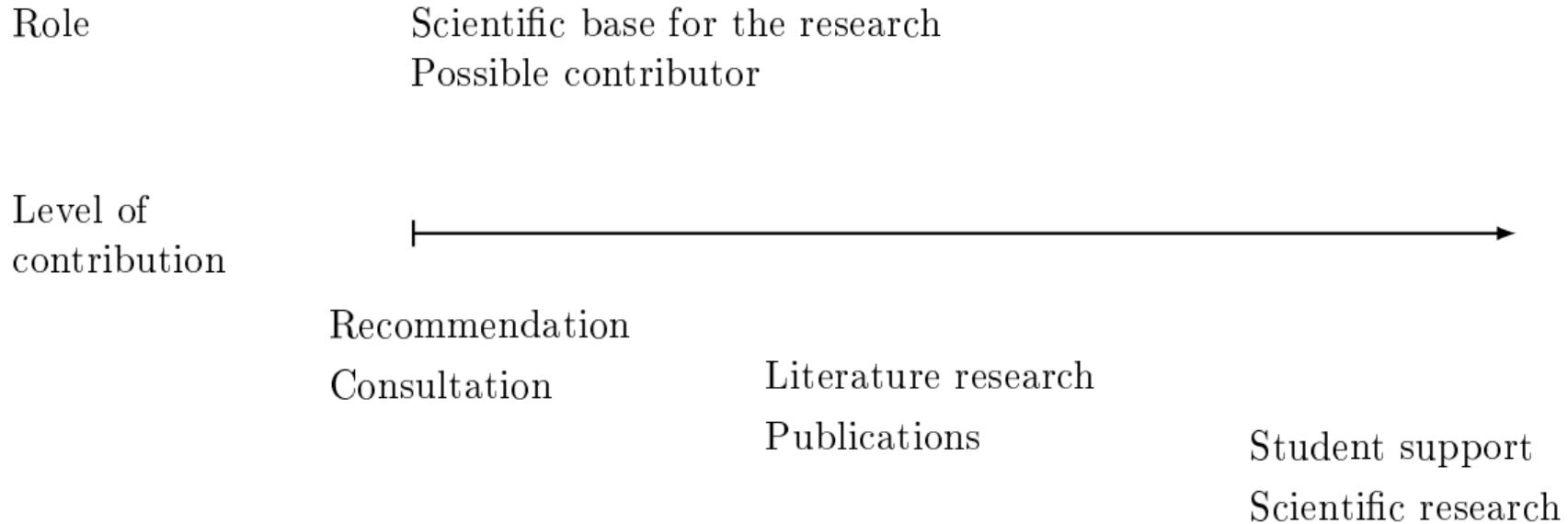


## Recommendation Consultation

# Department of Highway and Railway Engineering



# Department of Highway and Railway Engineering



# Form

Thank you very much for your kind attention!