

ENHANCING RAILWAY SYSTEM MAINTENANCE: AN AI-DRIVEN APPROACH TO IMPROVE THE PREVENTIVE MAINTENANCE OF RAIL TRACKS



University of
East London

AIM

We aim to enhance the efficiency of the UK rail network by integrating machine learning and computer vision technologies to develop a real-time detection system to identify leaf accumulation on railway tracks.

OBJECTIVES

- * Design and train a Convolutional Neural Network model to recognise and quantify leaf accumulation on railway tracks from visual data.
- * Implement a real-time monitoring system that integrates the trained model to assess rail track conditions continuously.

METHODOLOGY

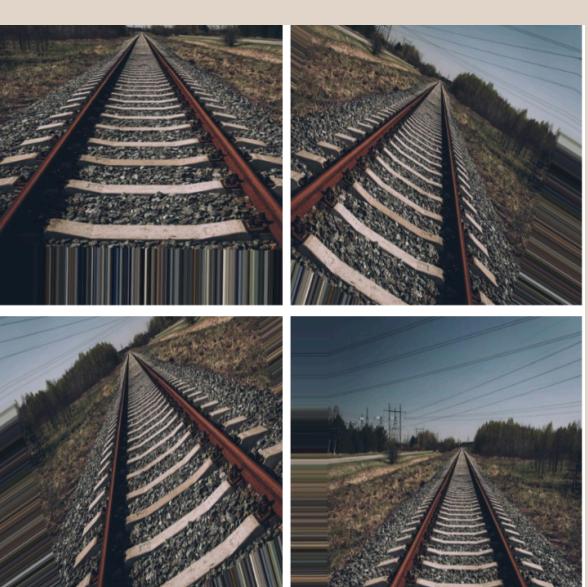
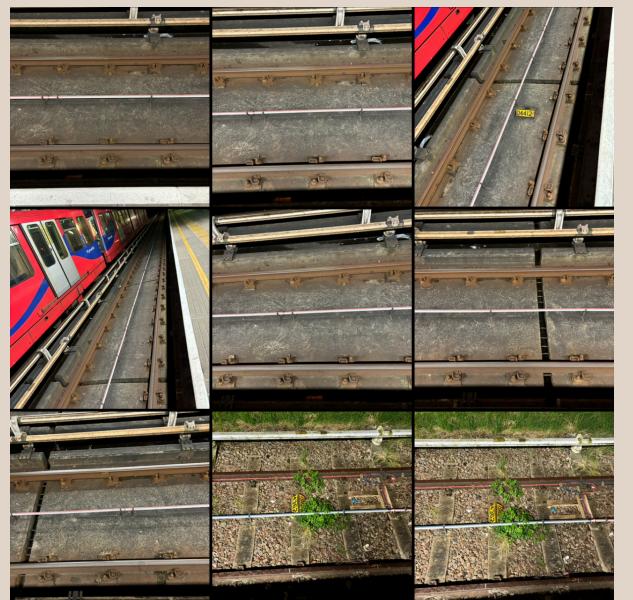
- * Use of Preprocessing, and augmentation techniques to enhance data gotten
- * Transfer learning using VGG19, ResNet50V2, InceptionV3, Xception.
- * Building a custom model to compare for the best.

DATA COLLECTED

Data was split into 60% Training, 20% Validating and 20% Testing.

We assembled our data from mostly these sources:

- * Direct rail track images
- * Railcam.uk
- * Google Images



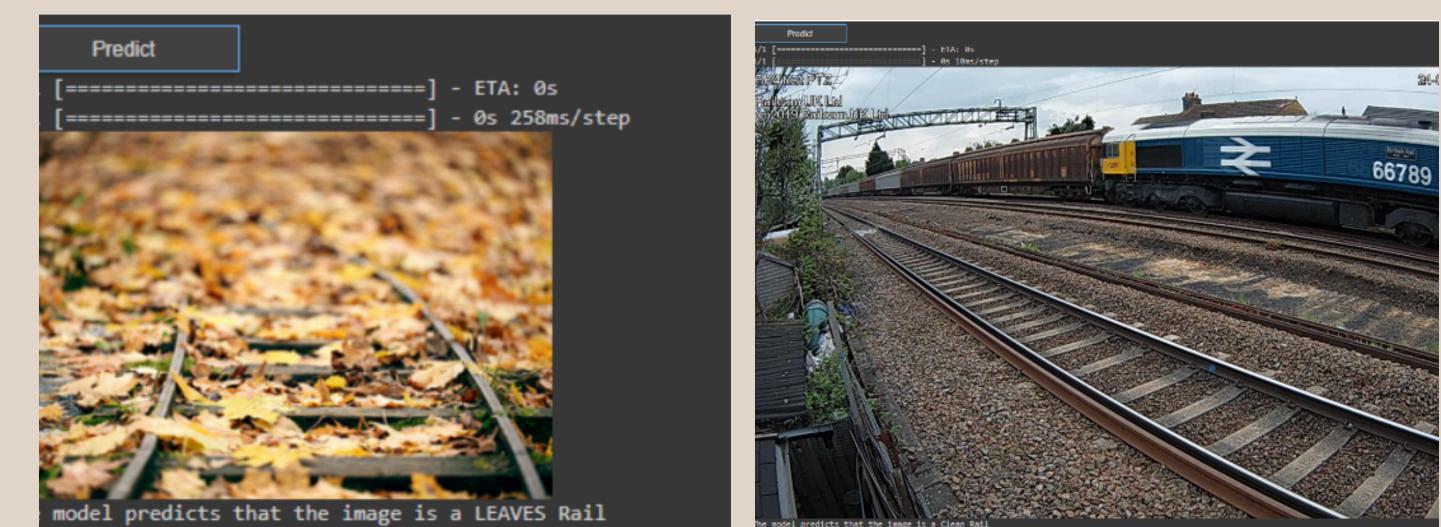
PREDICTION

Here, I would have a real-time prediction for you, just scan the code underneath.



FINDINGS

- * Our VGG19, transfer learning model had the most accuracy, 99.67%, for detecting this leaf accumulation issue.
- * My custom model came second with 99.34%



ACKNOWLEDGEMENTS

Genuinely, this work could not have been done without Dr. Rasha Mohammad's help in data collection process, special thanks to her

MY DETAILS

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LIMITATIONS

- Adequate data was not readily available
- Required high GPU for model training.
- Although, we account for snow and a few minor conditions, our model can't predict in extreme ones.