

Remote Sensing for Road Quality Monitoring

Use of remote sensing and IoT sensors to detect road wear and structural damages on roads

Introduction

Roads are a country's most important public asset and require billions of Euros in annual maintenance. Increasing traffic loads and climate change accelerate the deterioration process which is why new construction and maintenance solutions are needed. One approach showing great potential is predictive maintenance which is based on big data analysis to predict when and where the next defect will occur. The earlier the defects can be predicted and accordingly detected, the less time and money are required to fix the eventual damage which otherwise would grow exponentially. Unfortunately, public and private organisations in road maintenance struggle in the transition towards predictive maintenance systems since they lack the tools, knowledge and especially the data to make such predictions.

To generate more data and create better predictions, the start-up and European Space Agency incubatee RoadEO is developing a road quality monitoring application which combines remote sensing with crowdsourced sensors on the ground. They are piloting the project with 3 clients using satellite imagery and smartphone accelerometer sensors and now they are looking in expanding their application and use case with the help of the Pavement Engineering section.

Goal and objectives

Three separate graduation projects are offered:

1. Investigate the capabilities of novel smartphone cameras and/or GoPros to detect and categorize road defects with the help of machine vision.
2. Use available airborne imagery for provincial roads in the Netherlands to assess its capability to detect road wear and structural damages.
3. Investigate access and usability of in-car sensors to detect structural damages and wear on roads.

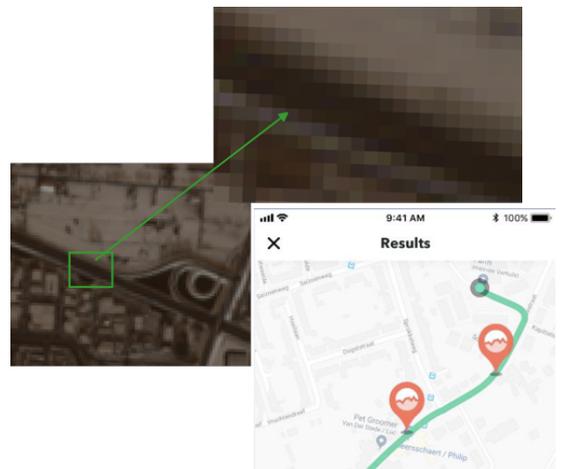
The main goal of all three projects is the investigation of novel data sources with regard to road quality monitoring. While Project 2 has plane imagery data available for 2 provincial roads in the Netherlands. Project 1 and 3 require the development of simple prototypes to generate the data before its processing.

The research project will be performed in the Pavement Engineering section, GEG of TU Delft, and RoadEO located at the European Space Agency Business Incubator in Noordwijk.

The candidate

We are looking for enthusiastic candidates with background in civil engineering or material sciences. The candidate should have affinity for computational calculation and numerical methods. The candidate should be able to work independently, but also enjoy collaborating with the team.

A commensurate remuneration can be arranged for this project.



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Graduation project

<http://www.pavements.citg.tudelft.nl>