

## Road Surface Condition Detection

### Bakgrund

Friction is an important component for driving, which enables the movement as well as to apply braking to avoid collisions. Today, emergency braking systems such as ABS are applied based on vehicle dynamics at the current moment. However, if there exists a method to predict the road friction ahead of the vehicle, both vehicle and the driver can be warned for low friction conditions ahead (for an example, icy patch or wet road patch ahead in the road). One major factor that affect the road friction is the road surface condition (RSC). While RSC is affected by many things, weather and road materials are major components. Depending on the weather, RSC can vary from dry, wet, snowy, icy, slush, etc. and different road materials (such tar, concrete, cobblestone etc.) will have different friction values. Therefore, based on RSC ahead of the vehicle, both the driver and vehicle can be prepared well to make the best decision for the safety of people and vehicles. While this is very important in the era of autonomous driving, it still is of significance in the present context.



### Problembeskrivning

Camera is an inexpensive sensor module that can collect a lot of information on the environment. Deep convolutional neural networks (CNN) have shown promising performance in effectively interpreting the information in images. The aim of this project is to use images in different CNN to identify the road surface conditions. This will be a real-world problem-solving scenario, where you would get the opportunity to create a dataset (from the images available in public datasets and images collected by Volvo cars), train different CNN on the data, test and compare the results and learn different methods to improve the accuracy of the models.

**Målgrupp:** TKAUT,, TKELT, TKDAT, TKTFY

**Gruppstorlek:** 4 – 6

**Antal grupper:** 1

**Förkunskapskrav:** Programming (mostly Python), Basic understanding on deep neural networks, Image processing

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**Projekt Rapport:** Engelska