

Developing a Smart Wiper System Adaptive to the Drivers' Behavior



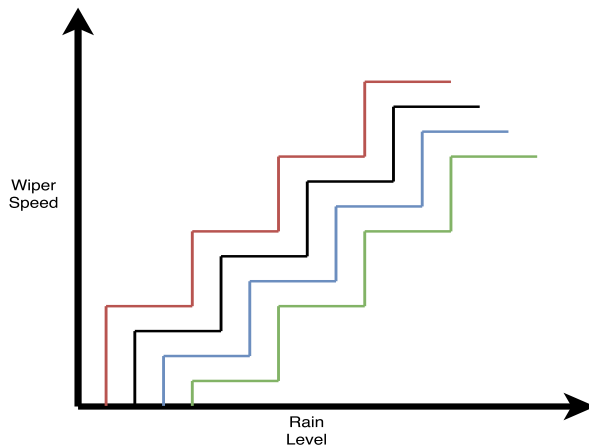
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Background

Current state of the development for the wiper system in cars is bounded to only two modes of **manual** and **automatic** for the driver with a sensitivity level. The automatic mode of the wiper systems is restricted to a limited set of modes (up to five) and adapts itself with the rain amount (sensors) on the front and rear windows. Figure below, indicates the behavior of the wiper speed in different modes.



Description

Most of the times, the drivers find themselves not satisfied with the behavior of the wiper (prefer either a lower or faster wiper speed) and setting it manually will eventually result in driver distraction. Moreover, the predefined modes for the wiper systems cover only limited number of actuator speeds and therefore there is a serious lack of personalization according to each users' specific preferences. The main objective of this project is to define a machine learning-based approach for the wiper system to be trained with the driver behavior in manual mode beside the sensed values of the **rain amount on the screen, wind direction, car speed and light intensity** sensors, then extract a pattern to be deployed in automatic mode in order to set up the wiper actuator speed accordingly. The whole process will be examined first on the embedded devices (e.g. Beaglebone, Raspberry Pi) then will be integrated into the real prototype car for the final evaluation.

Tasks

This student project consists of the following tasks:

- Deploying and configuring a table demonstrator with embedded devices and sensors
- Investigating the machine learning approaches for the purpose of the project
- Modeling and implementing the algorithm on the training dataset
- Evaluating of the developed approach on the prototype car
- Testing and Documenting the implementation

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Research project:
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Bachelor Thesis, Master Thesis

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Machine Learning

Programming language:
Python

Required skills:
Python, Linux, Machine Learning, Embedded Systems

Language:
Englisch

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