

Bachelor's Thesis

# Uncertainty Estimation for Quantized Neural Networks

An important part of autonomous driving is the capability of the car to be aware of its own uncertainty. This can allow the vehicle to decide if it is capable of driving autonomously or if a human operator should take over. At the same time, uncertainty estimates should be obtained as quickly as possible to be useful in real-time.

In this Bachelor thesis, a new approach for estimating the uncertainty of quantized neural networks is investigated. Quantized neural networks allow faster inference while requiring less memory to store. First, a regular neural network needs to be quantized and retrained. By varying the weights, multiple models can be obtained from a single network. The variance of the resulting different outputs can then be used to estimate the model uncertainty.

The goal of this thesis is to implement and analyze such an uncertainty estimation approach. The results can then be compared to existing uncertainty estimation methods.

## Advisors

Christopher Kuhn