

# STELLENAUSSCHREIBUNG

Bachelorarbeit, Masterarbeit, Studentische Abschlussarbeit

## DESIGN AND DEVELOPMENT OF NEW METHODOLOGIES TO DETECT AND PREVENT OVERFITTING IN NEURAL NETWORKS VIA NOISE PROPAGATION ANALYSIS

### UMFELD

In the recent decade neural networks have become one of the key solutions for solving a range of machine vision problems. Neural network (NN) learns to capture the underlying relationship from the data using parameters or weights present in different layers of the NN. When a NN is either trained for a long period of time or has less data to learn from, it overfits to the training data distribution. This leads to a severe problem of not generalizing to new or unseen data, which degrades the performance of the network.

### AUFGABEN

The main aim of the thesis is to come up with solid theoretical and practical experiments which should be able to detect when a model overfits post training or during training. Related studies include the impact of training with noisier and adversarial data and analysing the inference performances on a neural network from Bayesian Deep Learning.

- Thorough analysis on the research papers focused specifically towards SOTA solutions to how and why a NN overfits.
- Convert theoretical research into applied research towards the field of AV

### WIR BIETEN

- An interdisciplinary working environment with partners from science, industry and users
- An economic/industrial work environment and organisation
- A pleasant working atmosphere and constructive cooperation

### WIR ERWARTEN

- Good programming skills in Python
- Good Theoretical knowledge in the field of machine learning or Deep learning
- Good understanding of Convolutional Neural Networks and Bayesian Neural Networks. RNN's and Reinforcement learning is a plus
- Ability to grasp research concepts at faster pace
- Any previous knowledge of ML frameworks such as Tensorflow, PyTorch is a plus
- Very good German or English language skills

## BEWERBUNG

We're looking forward to receiving your PDF application to the mail [vivekana@fzi.de](mailto:vivekana@fzi.de) or [pavlitsk@fzi.de](mailto:pavlitsk@fzi.de), with the following documents:

- Current excerpt of grade sheet
- Updated curriculum vitae
- Themen-Schwerpunkt: Maschinelles Lernen, Mobilität, Sichere und intelligente Fahrzeuge, Sicherheit
- Studiengänge: Informatik, Informationstechnik, Informationswirtschaft, Mathematik, Verwandte Studiengänge, Wirtschaftsinformatik
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