University of Stuttgart
Germany

Institute of Signal Processing and System Theory
Prof. Dr.-Ing. Bin Yang

Supervisor:
Pascal Schlachter

Tel. (0711) 685-67337
pascal.schlachter@iss.uni-stuttgart.de

23.07.2024

Thesis offering for Research/Master Thesis

Area:

This thesis will explore the intersection of universal domain adaptation (UniDA) and few-/zero-shot learning. UniDA is a framework in machine learning that simultaneously addresses domain shift and category shift. Domain shift occurs when there are differences in input feature distributions between the training data (source domain) and test data (target domain). Category shift happens when the label spaces of the source and target domains are not identical, meaning some classes are present in the target domain but not in the source domain, and/or vice versa.

Few-/Zero-shot learning is a machine learning paradigm where a model is trained to recognize and classify instances of classes with only a few or no examples in the training dataset.

Task:

The goal of this thesis is to evaluate how few-/zero-shot learning methods can be combined with UniDA to identify new classes in the target domain instead of rejecting them as "unknown." Specifically, one possibility is to evaluate the potential of CLIP (Contrastive Language-Image Pretraining), which provides both good domain generalization and zero-shot performance out-of-the-box due to its extensive pre-training.

Prerequisites:

- Strong interest in the topic and a high level of self-motivation
- Ability to work independently
- Excellent grades in relevant courses at ISS
- Experience in programming with Python (ideally with experience in PyTorch)

How to apply:

Write an email to pascal.schlachter@iss.uni-stuttgart.de including your current transcript of records and a brief introduction of yourself.