The aim of the project is to develop a framework for recognition of emotions or distress analyzing images of animal faces (mice), eventually leading to the development of a tool for monitoring of animal well-being.

The Grimace Scale is a tool to assess pain and distress via facial expression of animals. The Mouse Grimace Scale implements 5 facial action units, orbital tightening, nose bulge, cheek bulge, ear position, and whisker change, that are scored on a scale from 0 to 2. The higher the overall score, the worse is the condition of the animal. Until now, the application of this method implies that a person, who is trained in using the Grimace Scale, monitors the animals. For the period in which the animals cannot be monitored, well-being cannot be assessed. Therefore, it is crucial to find an automated way to recognize an impairment of well-being as soon as animal behavior and facial expression change. The results of human evaluation of animal emotions/pain via animal photographs are promising, the accuracy was about 97% (pain versus non-pain) [1]. Furthermore, automated emotion recognition in humans is a hot topic and has advanced a lot recently [2]. In this thesis project, it is planned to transfer and evaluate this method to photographs of mice using a already established database [3] (129 mice, 387 labeled, and ca. 5000 unlabeled images).

Tasks:
- Literature research
- Data pre-processing and normalization
- Implementation of different supervised and unsupervised machine learning methods (e.g. Deep Believe Networks, Convolutional Neural Networks and Autoencoders)
- Evaluation of the implemented models

Requirements:
- Programming skills (e.g. C++, Matlab, Python)
- Knowledge in Computer Vision or Machine Learning (e.g. attendance of AIA, DIP or ML lectures)

Language: German or English
Contact: Manuel Wöllhaf (woellhaf@tu-berlin.de)

