**Short description of thesis**

**Thesis topic:** Facial expressions recognition

**Student:** Shtiliyan Alexandrov Uzunov, Informatics – Artificial Intelligence. FN: 24676

**Supervisor:** assoc. Dr Valleriya Simeonova

**Thesis goal:**

The purpose of the presented thesis is to build a system that can classify facial images into several categories, based on the expression on each image. Two different approaches are being used, and at the end there is a benchmark analysis between the two approaches.

**Tasks:**

1. Creation of two models for image classification. The first model’s architecture is purely based on convolutional neural network (CNN) and this model solves the task form end to end, example input – image, output – emotion label.
2. The second model is build using another convolutional neural network, which detects 68 facial landmarks, which are later being passed to a support vector machine, which makes the final classification.
3. Benchmark analysis between the two models.

**Execution:**

The models are implemented with the help of the python programming language, in combination with the libraries scikit-learn, tensorflow, keras, keras-gpu. The data set being used is Cohn-Kanade, which has information for about 500 video sessions, each one of which is annotated with emotion. The models architecture is CNN.

**Conclusion:**

The benchmarking analysis between the two models shows that the implementation of Model1 that solves the classification problem from end to end is less complicated, and with higher accuracy. This makes the first model applicable in practice. The use case for Model2 is in tasks, in which the internal information that it uses (the facial landmarks) can be used for additional data processing.