BRNO UNIVERSITY OF TECHNOLOGY
FACULTY OF MECHANICAL ENGINEERING

Specification Master's Thesis

Department:	Institute of Solid Mechanics, Mechatronics and Biomechanics
Student:	**Bc. Filip Špila**
Study programme:	Applied Sciences in Engineering
Study branch:	Mechatronics
Supervisor:	**doc. Ing. Jiří Krejsa, Ph.D.**
Academic year:	2019/20

Pursuant to Act no. 111/1998 concerning universities and the BUT study and examination rules, you have been assigned the following topic by the institute director Master's Thesis:

Semantic segmentation of images using convolutional neural networks

Concise characteristic of the task:

The task of image segmentation can be solved using various techniques, with convolutional neural networks becoming a promising approach lately. The focus of the thesis is to research, implement and perform benchmarking of selected convolutional neural networks used for semantic segmentation of images. The ideal outcome would be a network capable of being fitted to a user's custom set of training data and successfully performing segmentation of both simple image scenes containing only a single object class and more complex scenes containing multiple objects.

Goals Master's Thesis:

1) Get acquainted with convolution neural networks techniques used for image segmentation.
2) Research neural networks architectures used in the task and select the most promising one.
3) Create a custom training set for the network using appropriate software tool.
4) Create segmented (binary) images of both simple and complex scenes.
5) Evaluate the quality of segmentation.

Recommended bibliography:

SEWAK M. et. al., Practical Convolutional Neural Networks: Implement advanced deep learning models using Python, Packt Publishing Ltd, 2018

BALLAR W., Hands-On Deep Learning for Images with TensorFlow: Build intelligent computer vision applications using TensorFlow and Keras, Packt Publishing Ltd, 2018

Deadline for submission Master's Thesis is given by the Schedule of the Academic year 2019/20

In Brno,

L. S.

prof. Ing. Jindřich Petruška, CSc. Director of the Institute	doc. Ing. Jaroslav Katolický, Ph.D. FME dean