Comenius University in Bratislava
Faculty of Mathematics, Physics and Informatics

THESIS ASSIGNMENT

Name and Surname:	Bc. Adrián Matejov
Study programme:	Computer Science (Single degree study, master II. deg., full time form)
Field of Study:	Computer Science, Informatics
Type of Thesis:	Diploma Thesis
Language of Thesis:	English
Secondary language:	Slovak

Title: Efficient Convolutional Neural Networks Recognizing Driveable Trails

Annotation: Robotour is an annual outdoor delivery contest for autonomous robots. Robots navigate the trails located in a natural park to reach loading, unloading and servicing areas. They are typically equipped with laser range sensors, GPS, compass, map of the trail network in the park, and some other sensors. Information obtained from these sensors and the map is seldom accurate enough. The system typically depends on the vision system and its ability to recognize driveable surfaces. The mobile robotic system used by the team from this Faculty is a complete and functioning system. However it suffers from the low quality vision module that is based on a simple feed-forward neural network. The aim of this thesis is to investigate various models of convolutional neural networks that have been successfully applied to this task. Based on such analysis, the student will design, train, and evaluate an original model that could efficiently perform in real-time on the embedded GPU hardware installed in the robot (Jetson TX2). The student is expected to bring into play active learning, if it proofs to be beneficial in this context.

Literature: Jozef Dúc: Robotour with Laser Range Sensor, Diploma thesis, Faculty of Mathematics, Physics and Informatics, Comenius University, Bratislava, 2017.
Evan Shelhamer, Jonathan Long, Trevor Darrell: Fully Convolutional Networks for Semantic Segmentation, IEEE Transactions on Pattern Analysis and Machine Intelligence, vol.39, no.4, p.640-651, April 2017

Keywords: robotour, CNN, path recognition, autonomous driving

Supervisor:	Mgr. Pavel Petrovič, PhD.
Consultant:	Mgr. Marek Šuppa
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Head of department:	prof. Ing. Igor Farkaš, Dr.
Assigned:	07.12.2018
Approved:	19.12.2018

prof. RNDr. Rastislav Kráľovič, PhD.
Guarantor of Study Programme

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Student

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Supervisor