MASTER'S THESIS ASSIGNMENT

I. Personal and study details

Student's name: **Burde Varun** Personal ID number: **478596**

Faculty / Institute: **Faculty of Electrical Engineering**

Department / Institute: **Department of Control Engineering**

Study program: **Cybernetics and Robotics**

Branch of study: **Cybernetics and Robotics**

II. Master's thesis details

Master's thesis title in English:

Deep neural network for city mapping using Google Street View data

Master's thesis title in Czech:

Hluboká neuronová sít pro mapování města s využitím dat z Google Street View

Guidelines:

The aim is to design, implement and experimentally evaluate a deep neural network based solution for city mapping using Google Street View images. The proposed software solution should allow the user to request Google Street View imagery for any given location specified as geojson, perform analysis and feature extraction using deep neural network(s) and output vectorized description projected and visualized over an underlying map. User interface for the application execution, processing of the input images and visualization of the results should be realized using Google Colab to utilize Google TPUs. Existing pre-trained models should be explored first, thorough experimental evaluation on publicly available datasets should follow. Comparison with related state-of-the-art work is integral part of the work and should be presented in the final thesis. Recommendation: implementation should be done in Python, using Keras and TensorFlow frameworks.

Bibliography / sources:

[1] Goodfellow, Ian, et al. „Deep Learning", MIT Press, 2016
[2] Szegedy, Christian, et al. "Inception-v4, Inception-ResNet and the Impact of Residual Connections on Learning." AAAI. 2017. APA
[3] He, Kaiming, et al. "Mask R-CNN" arXiv preprint arXiv:1703.06870 (2017).
[4] Liu, Ming-Yu, et al. "Layered interpretation of street view images." arXiv preprint arXiv:1506.04723 (2015).
[5] Kang, Jian, et al. "Building instance classification using street view images." ISPRS Journal of Photogrammetry and Remote Sensing (2018).
[6] Law, Stephen, Brooks Paige, and Chris Russell. "Take a look around: using street view and satellite images to estimate house prices." arXiv preprint arXiv:1807.07155 (2018).
[7] Abadi, Martın, et al. "TensorFlow: Large-scale machine learning on heterogeneous systems, 2015." Software available from tensorflow.org.

Name and workplace of master's thesis supervisor:

Ing. Michal Reinštein, Ph.D., Vision for Robotics and Autonomous Systems, FEE

Name and workplace of second master's thesis supervisor or consultant:

Date of master's thesis assignment: _____ Deadline for master's thesis submission: _____

Assignment valid until:
by the end of summer semester 2019/2020

Ing. Michal Reinštein, Ph.D.	prof. Ing. Michael Šebek, DrSc.	prof. Ing. Pavel Ripka, CSc.
Supervisor's signature	Head of department's signature	Dean's signature

III. Assignment receipt

The student acknowledges that the master's thesis is an individual work. The student must produce his thesis without the assistance of others, with the exception of provided consultations. Within the master's thesis, the author must state the names of consultants and include a list of references.

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Date of assignment receipt

_____
Student's signature