MASTER'S THESIS ASSIGNMENT

I. Personal and study details

Student's name: **Rozsypálek Zdeněk** Personal ID number: **457216**

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:

Brick detection for MBZIRC competition

Master's thesis title in Czech:

Detekce cihel pro soutěž MBZIRC

Guidelines:

1) Study methods for analysis of Velodyne spatial depth data and study MBZIRC competition rules.
2) Analyze data from a Velodyne sensor placed on a ground robot and design an algorithm for detection a wall made up of blocks of predetermined sizes. The output of the algorithm should be a list of 3D cuboid positions relative to the robot position.
3) Design an algorithm that would create a map of the wall and allow to combine measurements from multiple robot positions.
4) Test the algorithm on real sensor data.

Bibliography / sources:

[1] Himmelsbach, Michael, et al. "LIDAR-based 3D object perception." Proceedings of 1st international workshop on cognition for technical systems. Vol. 1. 2008.
[2] Dou M., Guan L., Frahm JM., Fuchs H. (2013) Exploring High-Level Plane Primitives for Indoor 3D Reconstruction with a Hand-held RGB-D Camera. In: Park JI., Kim J. (eds) Computer Vision - ACCV 2012 Workshops. ACCV 2012. Lecture Notes in Computer Science, vol 7729. Springer, Berlin, Heidelberg
[3] Ma, L., Kerl, C., Stückler, J., & Cremers, D. (2016, May). CPA-SLAM: Consistent plane-model alignment for direct RGB-D SLAM. In 2016 IEEE International Conference on Robotics and Automation (ICRA) (pp. 1285-1291). IEEE.

Name and workplace of master's thesis supervisor:

RNDr. Petr Štěpán, Ph.D., Multi-robot Systems, FEE

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

Date of master's thesis assignment: **14.01.2020** Deadline for master's thesis submission: **22.05.2020**

Assignment valid until:
by the end of summer semester 2020/2021

RNDr. Petr Štěpán, Ph.D.	prof. Ing. Michael Šebek, DrSc.	prof. Mgr. Petr Páta, Ph.D.
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.

Date of assignment receipt

Student's signature