

Tárgy neve: 3D point cloud processing and analysis

Tárgyfelelős neve: Gulyás László

Tárgyfelelős tudományos fokozata: PhD

Tárgyfelelős MAB szerinti akkreditációs státusza: AT

Az oktatás célja angolul / Aim of the subject:

Knowledge

- Complex and up-to-date knowledge of three-dimensional point cloud analysis, visual design, implementation, operation, and maintenance of vision systems, descriptive 3d geometry.
- Has a high level of detailed knowledge and understanding of the technical vocabulary of the relevant field, expressive and conceptual features in English.

Abilities:

- Has the ability to plan, develop, operate, and manage complex computer vision systems and point cloud processing systems.
- Can work proactively in a collaborative and project (team) environment.
- Able to communicate in written and spoken English with a high level of technical vocabulary in the field participate in discussions, prepare reports, scientific, technical, and professional technical/technical material (books, articles, etc.) and use it in a creative way.
- Able to use professional sources of information, to understand the problems to be solved to extract, critically interpret, and evaluate knowledge relevant to the problem to be solved.
- Has the ability to apply IT skills to a wide range of multidisciplinary professional in a multidisciplinary environment.

Attitude:

- They are committed to critical feedback and evaluation based on self-examination.
- They are committed to lifelong learning, and they are open to acquiring new competencies.
- They share their knowledge and consider it important to discuss their solutions with others.
- They are open to proactive collaboration with other professionals.

Autonomy, responsibility:

- They undertake to meet deadlines and to have deadlines met.
- They bear responsibility for their own studies as well as for the development of their classmates.

Az oktatás tartalma angolul / Major topics:

3D vision with 3D point cloud as a complementary approach for 2D vision, point cloud processing and analysis, Filtering, Nearest neighbour search, Model fitting, point cloud features, feature detectors, feature descriptor, deep learning based-point cloud analysis

A számonkérés és értékelés rendszere angolul / Requirements and evaluation:

Mixed assessment

Irodalom / Literature:

- Shan Liu, Min Zhang, Pranav Kadam, C.-C. Jay Kuo. 3D Point Cloud Analysis, Traditional, Deep Learning, and Explainable Machine Learning Methods, 1st ed. 2021 ISBN-N13 9783030891794
- Yulan Guo*, Hanyun Wang*, Qingyong Hu*, Hao Liu*, Li Liu, and Mohammed Bennamoun. Deep learning for 3D Point Clouds: A survey. arXiv:1912.12033
- Large-Scale 3D Point Cloud Processing Tutorial 2013 <http://kos.informatik.uni-osnabrueck.de/icar2013/>
- Weinmann Martin. Reconstruction and analysis of 3D scenes, From Irregular Distribution 3D Points to Object Classes. 1st ed. 2016 ISBN: 978-3-319-29244-1