T-869-COMP   **COMPUTER VISION APPLICATIONS**   **6 ECTS**

Year of study: First year MSc.
Semester: Fall.
Level of course: 5. Second cycle, intermediate.
Type of course: Elective.
Prerequisites: N/A
Schedule: Runs for 3 weeks - 4 teaching hours a day.
Supervisor: Torfi Þórhallsson.
Lecturer: Torfi Þórhallsson.

Learning outcome:
Knowledge:
After the course the students should be able **to recall, describe and define**, the following terms: Image formation, cameras and projection models, low-level image processing methods such as filtering and edge detection; mid-level vision topics such as segmentation and clustering; shape reconstruction from stereo, as well as high-level vision tasks such as object recognition, scene recognition, face detection and human motion categorization.
Skills:
After the course the students should be able to use Open CV and/or other real-time computer vision tools to acquire image data and **implement** computer vision algorithms to detect and recognize facial expressions and apply these techniques to emotion classification.
Competence:
After the course the students should be able **to design** a suitable computer vision algorithm and recognition techniques for real world problems, **evaluate** algorithmic performance and compare different designs and implementations and **interpret** the results. The students should also be able to **present** findings and new results in the subject.

Content: Image formation, cameras and projection models, low-level image processing methods such as filtering, edge detection, interest operators, optical flow; mid-level vision topics such as model fitting and image-to-image matching; shape and motion estimation from multiple cameras, multiple-view constraints, probabilistic models and MAP estimationt, robust estimation using RANSAC; high-level vision tasks such as object and scene recognition, tracking using dynamic models and Kalman filtering.

Reading material: Richard Szeliski, Computer Vision Algorithms and Applications. Other materials will be introduced in the first lecture.
Teaching and learning activities: Tutorials, introductory assignments, and supervised final project.
Assessment methods: Assignments (20%); Seminar (10%); Project definition (15%); Demo 1 (20%); Demo 2 (20%); Final Report (15%).
Language of instruction: English.

All course descriptions may be subject to change. Revised information on the course schedule, reading material, teaching and learning activities, and assessment methods will be introduced in the learning management system Canvas at the beginning of the semester.