Module Code | CSU44054
---|---
Module Name | Augmented Reality
ECTS Weighting | 5 ECTS
Semester taught | Semester 2
Module Coordinator/s | Professor Aljosa Smolic

Module Learning Outcomes

On successful completion of this module, students will be able to:

- **LO1.** Review and assess the state-of-the-art in augmented reality technologies
- **LO2.** Develop an augmented reality solution (project) including implementation, testing, evaluation, demonstration, and documentation
- **LO3.** Come up with own ideas for an augmented reality project

Module Content

This course covers fundamentals and state-of-the-art in augmented reality, as well as related areas of 3D computer vision and graphics. Theoretical background as well as practical solutions and applications will be presented in the lectures. Students will get direct exposure to latest research results of Prof. Smolic’s research team V-SENSE. In their own work, students will be asked to design an own project (individual or groups) from idea, via implementation, testing, evaluation, demonstration, to documentation. In this way they will experience the full lifecycle of a practical project, as they will face it once they leave the university in either industry or research. A default project will be suggested as fall back, still covering the full lifecycle except the idea.

Specific topics addressed in this module include:

- Camera model and calibration
- Fundamentals of 3D computer vision and multiview geometry (fundamental and essential matrix)
- Structure-from-motion
- SLAM
- Shape-from-silhouette, visual hulls
- Depth and disparity estimation
- Homographies, warping, panoramas, 360/VR video
- Volumetric video
- AR/VR software and platforms

1 TEP Glossary
Teaching and Learning Methods

Lectures, project (see more details above)

Assessment Details

<table>
<thead>
<tr>
<th>Assessment Component</th>
<th>Brief Description</th>
<th>Learning Outcomes Addressed</th>
<th>% of total</th>
<th>Week set</th>
<th>Week due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project</td>
<td>See above</td>
<td>LO1, LO2, LO3</td>
<td>100%</td>
<td>n/a</td>
<td>n/a</td>
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Reassessment Details

Project

Contact Hours and Indicative Student Workload

<table>
<thead>
<tr>
<th>Contact Hours (scheduled hours per student over full module), broken down by:</th>
<th>33 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>lecture</td>
<td>22 hours</td>
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<tr>
<td>laboratory</td>
<td>11 hours</td>
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<tr>
<td>tutorial or seminar</td>
<td>0 hours</td>
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<tr>
<td>other</td>
<td>0 hours</td>
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<table>
<thead>
<tr>
<th>Independent study (outside scheduled contact hours), broken down by:</th>
<th>72 hours</th>
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</thead>
<tbody>
<tr>
<td>preparation for classes and review of material</td>
<td>22 hours</td>
</tr>
<tr>
<td>completion of project</td>
<td>50 hours</td>
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| Total Hours | 116 hours |

Recommended Reading List

Fundamentals of computer vision in any form, e.g.


http://www.robots.ox.ac.uk/~vgg/pszbook/

Module Pre-requisites

Prerequisite modules: Background in fundamentals of computer vision and graphics (CS7GV1, CS7GV6) or (CSU44052, CSU44053) will be very helpful but not necessarily required.

Other/alternative non-module prerequisites: Knowledge in Python, OpenCV, Unity, Vuforia, ARCore, ARKit will be helpful but not necessarily required.

Module Website

2 TEPP Guidelines on Workload and Assessment