Advanced Topics in 3D Computer Vision – Lab Course/Praktikum

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Prof. Dr. Nassir Navab

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Application

• 2-Stage Application (refer to http://campar.in.tum.de/Chair/TeachingWs20AT3DCV):

  1. https://wiki.tum.de/display/campforms/Application+for+Praktikum%3A+Advanced+Topics+in+3D+Computer+Vision
     - Deadline 21.07.2020

  2. https://matching.in.tum.de

• We select appropriate candidates based on their background, interests, and motivation
Lecture Structure

- Lectures on 3DCV Topic
- Individual Assignment
- Group Projects
- Final Demonstration
- Intermediate Presentation
- Idea Workshop
- Check Web Credentials: email us (see emails on last slide)

Percentage Breakdown:
- Lectures on 3DCV Topic: 4x (40%)
- Individual Assignment: 55%
- Group Projects: 15%
Communication – Virtual/On-sight Lectures

• Depending on government regulations/ TUM regulations

• Communication via Zoom (for virtual lectures and Chat)

• See website for updates (http://campar.in.tum.de/Chair/TeachingWs20AT3DCV)
• Lecture 1: Basic Tips and Knowledge for Deep 3D Vision
• Lecture 2: Sensing Depth with 3D Computer Vision
• Lecture 3: Visual Self-Localization - Classical Methods and Learning-based Approaches
• Lecture 4: 3D Deep Learning
## Schedule

The schedule is preliminary and still subject to change. Please check the course website regularly!

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Location</th>
<th>Topic</th>
<th>Conducted by</th>
<th>Materials</th>
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</thead>
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| 14.07.2020  | 13.00 – 14.00 |          | Preliminary Meeting via Zoom. Enter with “at3dcv”                     | Patrick Ruhkamp  
Benjamin Busam  
Hyun Jun Jung |                                  |
| 15.10.2020  | 10.00 – 11.30 |          | Lecture 1: Basic Tips and Knowledge for Deep 3D Vision                | Hyun Jun Jung                                    |                                |
| 21.10.2020  | 23:59 CET  | Upload   | Solutions to Challenge 1                                              | Students                                         |                                |
| 22.10.2020  | 10.00 – 11.30 |          | Lecture 2: Sensing Depth with 3D Computer Vision                      | Benjamin Busam                                   |                                |
| 28.11.2020  | 23:59 CET  | Upload   | Solutions to Challenge 2                                              | Students                                         |                                |
| 04.11.2020  | 23:59 CET  | Upload   | Solutions to Challenge 3                                              | Students                                         |                                |
| 05.11.2020  | 10.00 – 11.30 |          | Lecture 4: 3D Deep Learning                                            | Mahdi Saleh                                      |                                |
| 11.11.2020  | 23:59 CET  | Upload   | Solutions to Challenge 4                                              | Students                                         |                                |
| 21.11.2020  | to be announced (workshop session) |          | Project Brainstorming Workshop (attendance mandatory)                | Benjamin Busam  
Mahdi Saleh  
Patrick Ruhkamp  
Hyun Jun Jung |                                |
| 14.01.2021  | 10.00 – 11.30 |          | Project Update Presentations (attendance mandatory)                   | Benjamin Busam  
Mahdi Saleh  
Patrick Ruhkamp  
Hyun Jun Jung |                                |
| 05.02.2021  | to be announced (evening) |          | Final Workshop (attendance mandatory)                                | Benjamin Busam  
Mahdi Saleh  
Patrick Ruhkamp  
Hyun Jun Jung |                                |
Group Projects

- Students will be matched by taking their preferences into account
- Potential project ideas will be suggested during lectures
- Final project proposals of the group will be discussed in workshop session
- We are open to suggestions and ideas!!!
- Projects can either be applied on real world problems OR try to solve open research questions
What to expect

• Gain detailed knowledge in modern computer vision problems
• Study relevant Deep Learning methods
• Understand to see the world in 3D
• Lectures provide starting point for your projects
• Solve 3D Computer Vision tasks
• Apply your acquired knowledge in real scenarios and/or push the boundaries of research in Computer Vision
What we expect

• Interest in Computer Vision

• Independent and pro-active participation

• Actively asking for help (team members and tutors)

• Coding knowledge

• Working dedicated in your team towards achieving the goals of your group project
Previous Projects
AT3DCV
2018
1. Furniture Replacement

RE. CONSTRUCTION
SE. GMENTATION
AU. GMENTATION
2. Garbage Evaporating Autonomous Robot (a.k.a. Trash Hugger)
2. Garbage Evaporating Autonomous Robot (a.k.a. Trash Hugger)
Robot in action!
Questions

- Benjamin Busam: b.busam@tum.de
- Mahdi Saleh: m.saleh@tum.de
- Patrick Ruhkamp: p.ruwkamp@tum.de
- Hyunjun Jung: hyunjun.jung@tum.de

- [http://campar.in.tum.de/Chair/TeachingWs20AT3DCV](http://campar.in.tum.de/Chair/TeachingWs20AT3DCV)

- Previous: [http://campar.in.tum.de/Chair/TeachingWs18AT3DCV](http://campar.in.tum.de/Chair/TeachingWs18AT3DCV)