Chair for Computer Aided Medical Procedures & Augmented Reality
Team

Organizer

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Tutors

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Popularity?
obtained via matching.in.tum.de

108 Applicants in WS17

157 Applicants in SS18

164 Applicants in SS19

Computer Aided Medical Procedures
Chair for Computer Aided Medical Procedures (CAMP)
Master Seminar on
Deep Learning for Medical Applications

Course Regulations

Technische Universität München
Basic Info about the course

- **Type**: Master Seminar (IN2107)
- **Language**: English
- **SWS**: 2
- **ECTS**: 5 Credits
- **Webpage**:
  - [http://campar.in.tum.de/Chair/TeachingSs19DLMA](http://campar.in.tum.de/Chair/TeachingSs19DLMA) (files are password-protected)
- **Time**:  
  - Thursdays, 12-14
- **Location**:  
  - CAMP Seminar Room (03.13.010)
- **Requirements**:  
  - Good Background in Machine/Deep Learning methods.
Objective

- Learn through read, understand, present, and discuss many challenges present in Medical Applications:
  - Understanding and Interpreting Predictive Models —> Interpretable ML
  - Handling few amount of labeled data —> Transfer Learning, Semi-/Weakly-Supervised Learning, Meta-Learning
  - Handling class Imbalance —> Special loss functions
  - Handling Multi-Modal Data —> Graph Convolutional Networks
  - Handling Intra/Inter-Scanners Variability —> Domain Adaptation
  - Incorporating Prior Knowledge —> Shape Models/Geometric Constraints
  - Uncertainty of Predictive Models
  - Security of Predictive Models —> Adversarial examples
Discussed papers:

- **Techniques:**
  - Convolutional Neural Networks (CNN)
  - Fully Convolutional Networks (FCN)
  - Long Short Term Memory (LSTM)
  - Generative Adversarial Networks (GAN)
  - Convolutional AutoEncoders (CAE)

- **Medical Applications:**
  - Lesion Detection
  - Lesion Segmentation
  - Image Parsing/Retrieval
  - Multi-Instance Learning
  - Crowdsourcing
# Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Session: Topic</th>
<th>Slides</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.07.2019 (13–14)</td>
<td>Preliminary Meeting</td>
<td>Slides</td>
<td></td>
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<tr>
<td>Online</td>
<td>Paper Assignment</td>
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<tr>
<td>24.10.2019</td>
<td>No Class!</td>
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<tr>
<td>31.10.2019</td>
<td>Intro. to our DLMA Seminar</td>
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<td>07.11.2019</td>
<td>Presentation Session 1: Supervised and Unsupervised Learning</td>
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<td>14.11.2019</td>
<td>Presentation Session 2: Semi/Weakly/Webly-Supervised Learning</td>
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<td>21.11.2019</td>
<td>Presentation Session 3: Interpretable ML</td>
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<td>28.11.2019</td>
<td>Presentation Session 4: Spatio-Temporal ML</td>
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<tr>
<td>05.12.2019</td>
<td>Presentation Session 5: Domain Adaption</td>
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Evaluation

Presentation (45%)

- 20 minutes + 10 minutes Q&A
- slides (Powerpoints, Latex, see website for templates)
- they should cover all relevant aspects of the paper
  - Motivation
  - Methodology
  - Experimental results
  - Take Home Message
  - Discussion
- self-contained (review of state of the art is necessary!)
- all students are expected to attend all presentations and interact during Q&A
Blog Post (45%)

- Blog post explaining the **main ideas of the paper**.
  - Motivation + Contributions (25%)
  - Methodology (50%)
  - Results & Discussion (25%)

- You can refer to [https://bair.berkeley.edu/blog/](https://bair.berkeley.edu/blog/) to get ideas for how a quality blog post summarising a paper should look like.

- Students will be requested to **comment on each other's blog posts**.
- The website where the posts will be uploaded is [1].
- You can later privately share your blog posts in other websites as well (eg Medium).

Attendance (10%)

[1] [https://wiki.tum.de/pages/](https://wiki.tum.de/pages/)
How can you apply?

• Send us a motivation e-mail with the title “DLMA_Application”

• Send the e-mail to: dlma@mailnavab.informatik.tu-muenchen.de

• **Template** for e-mail:
  
  • Name:
  
  • Master's program:
  
  • Current Semester:
  
  • Related courses (if passed, mention the grade):
  
  • Short Motivation (**Max 3 sentences.** It should include related projects/publications/competitions/github repositories):

**Deadline for motivation e-mails: 24.07.2019**
Important Dates

Deadline for motivation e-mails:  
24.07.2019

You can find these slides and other info on the course website:  
http://campar.in.tum.de/Chair/TeachingWs19DLMA

Don’t forget to register at TUM matching system

Register via matching.in.tum.de  
19.07 to 24.07.2019: