



Chair for Computer Aided Medical Procedures (CAMP)
Practical course on
Machine Learning in Medical Imaging



Technische Universität München

Slides by:

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Team

Organzier



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Tutors



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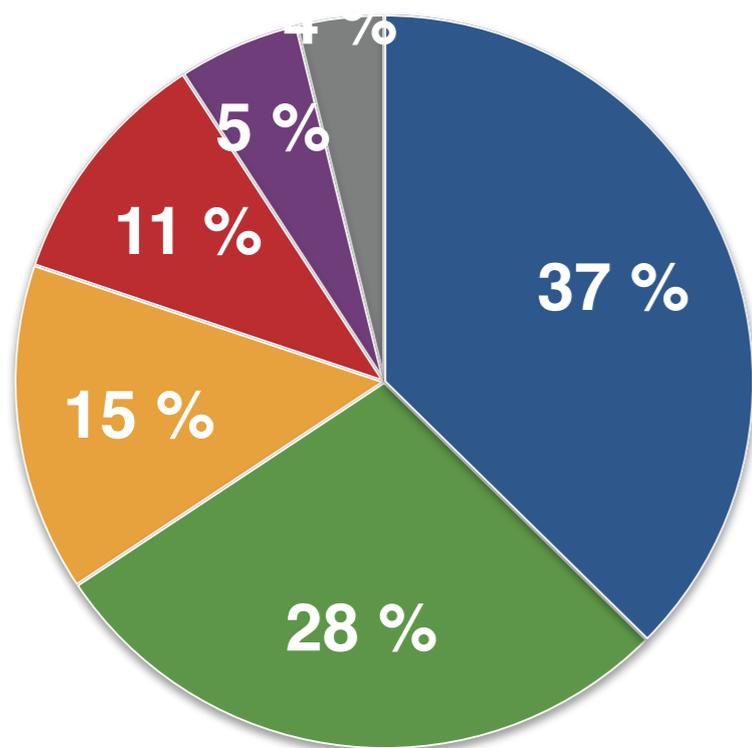
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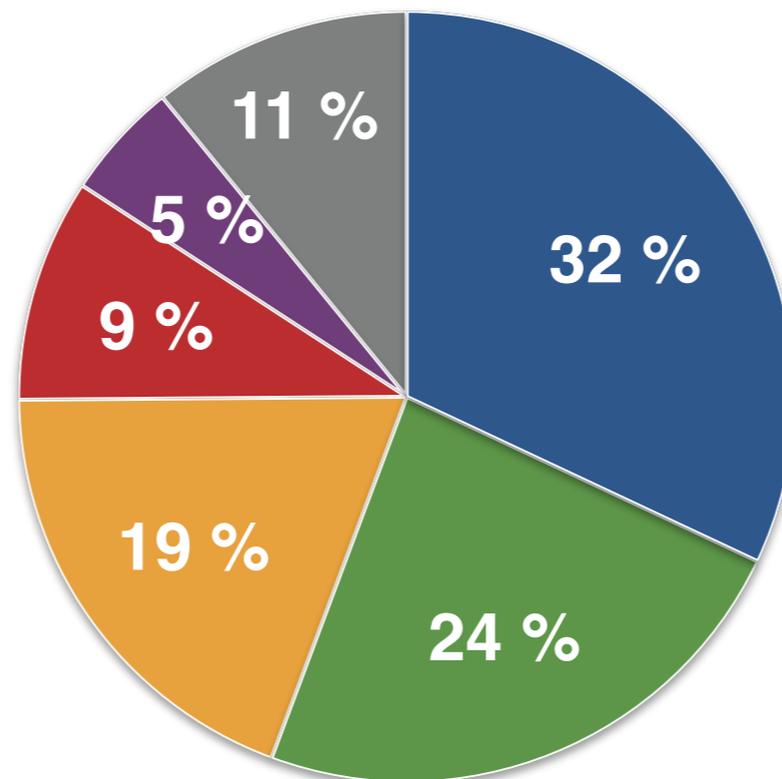
Popularity?

obtained via matching.in.tum.de

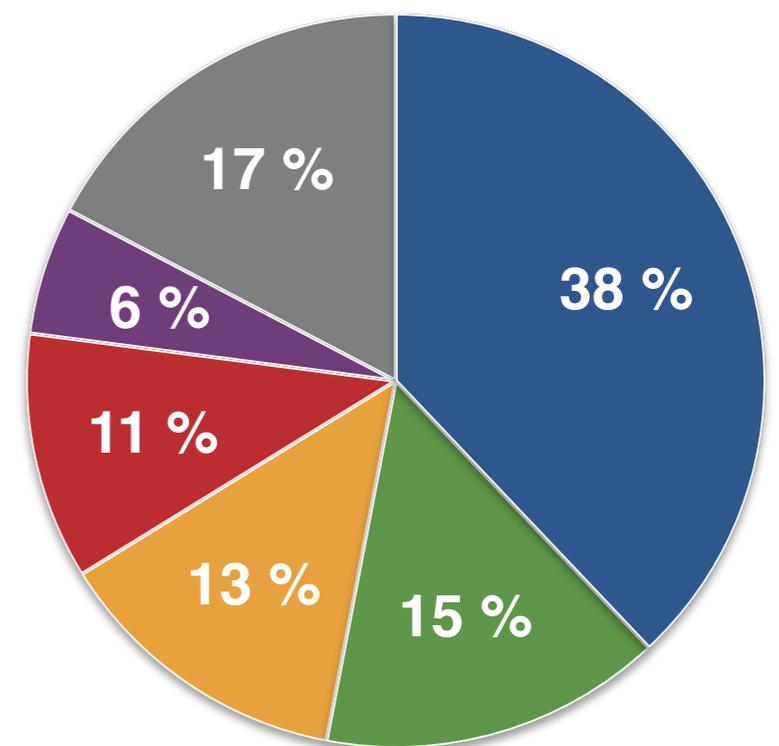
131 Applicants in WS17



203 Applicants in SS18



266 Applicants in SS19



● Rank #1 ● Rank #2 ● Rank #3 ● Rank #4 ● Rank #5 ● rest





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Course Regulations



Technische Universität München

Basic Info about the course

- **Type:** Master Practical Course Module (IN2016)
- **Language:** English
- **SWS:** 6
- **ECTS:** 10 Credits
- **Webpage:**
 - <http://campar.in.tum.de/Chair/TeachingWs19MLMI> (**files are password-protected**)
- **Time:**
 - **Thursdays, 16-18**
- **Location:**
 - CAMP Seminar Room (**03.13.010**)
- **Requirements:**
 - Good knowledge of machine learning methods and terminology: knowledge of the meaning of the words classification, regression, dataset, cross-validation ...
 - Strong knowledge of Python programming language
 - Background in image processing
 - Knowledge of main concepts of object-oriented programming, basic software engineering, image processing libraries and linear algebra libraries.



Objective

- **Learn through practice**
 - the **application of different machine learning methods**
 - to solve problems involving **medial images**.
- **The lab course is subdivided into:**
 1. **A few introductory lectures** on machine/deep learning and its application in different problems involving medical imaging,
 2. a number of **exercises hands-on** to apply these methods to a given dataset, and
 3. a **machine deep learning project** on medical application.



Schedule

Date	Topic	By	Slides	Homework
18.07.2019	Preliminary Meeting	Shadi	Slides	
Online	Project Assignment	Shadi		
24.10.2019	Intro. to DL (Tentative)	Shadi		
31.10.2019	Neural Networks (NN)	Roger		
07.11.2019	Convolutional Neural Networks (CNN)	Ashkan		
14.11.2019				
21.11.2019	Generative Models (CAE, VAE, GANs)	Azade		
28.11.2019 (tentative)	Recurrent Models (RNN, LSTM)	Anjany?		
05.12.2019	Robustness	Magda		
12.12.2019	Intermediate Presentation	all tutors	Guidelines	
19.12.2019				
06.02.2020	Final Presentation	all tutors	Guidelines	



Projects

- **Structure:**
 - 5 Groups of 4 students (max. 20 students)
 - Weekly meeting with your supervisor
- **Example:**

ID	Project	Tutor
1	DRIVE: Digital Retinal Images for Vessel Extraction	Anees
2	Chest X-ray Classification and Localization	Ashkan
3	X-Ray Landmark Detection	Matthias
4	Attention and Focal Loss in Single-Organ Segmentation	Roger
5	SoS? Inversion in Medical Ultrasound	Walter



Evaluation

Project (100%)

Progress (60%)

- Weekly supervision sessions with the tutors
- Define a list of ToDo's
- Share a code repository
- Student's contribution will be monitored on LrzGit.
- Evaluated by the tutor!

Presentation (40%)

- Intermediate Presentation (10 mins + 3 mins. Q&A)
- Final Presentations (20 mins + 5 mins. Q&A).
- Evaluated by the all tutors!



How can you apply?

- Send us a motivation e-mail with the title “**MLMI_Application**”
- Send the e-mail to: **mlmi@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/TeachingWs19MLMI>

Don't forget to register at TUM matching system

Register via matching.in.tum.de

19.07 to 24.07.2019:

