

Deep Learning Tutorial

ZD.B Chair of Embedded Intelligence for Health Care and Wellbeing

Manuel Milling, Alice Baird, Thomas Wiest

Manuel Milling

- Studied in Augsburg: B.Sc. Physik, B.Sc. Informatik, M.Sc. Physik
- Since October 2018: Doktorand & Wiss. MA
- Projects: De-Enigma (Robot-Assisted Therapies for children with Autistic Development Disorder)
- Research Topics: Deep Learning, Affective Computing



Alice Baird

- Interdisciplinary background in Computer Science and the Arts (BA/MFA).
- Since September 2016: Doktorand + Wiss. MA
- Currently a Center for Digitisation Bavaria Fellow
- Research Topics: Computer audition, Speech Processing, Affective computing



Thomas Wiest

- Studied in Augsburg: B.Sc. Computer Science, M.Sc. Computer Science
- Since July 2019: Doktorand & Wiss. MA
- Projects: sustAGE (Smart solution to support the employment and later retirement of older adults from work)
- Research Topics: Speech Emotion Recognition, Data Augmentation



- Start: 23rd Oct
- Every Wednesday in 1058N
- 10 Weekly Exercise Sheets
- 11th Exercise Sheet: Three-Week Group Challenge
- Team Work encouraged (Starting from Ex. 3)
- Programming, Maths Exercises, Additional Questions

- Solve Exercise Sheets and Participate in Tutorial
- Average of ~20 Possible Points per Exercise Sheet
- Additional 50% of Points for Presentation in Tutorial
- 75% of Points needed for Exam Bonus
- Exam Bonus: 0,3/0,4 (1,3 \rightarrow 1,0/ 1,7 \rightarrow 1,3)
- Bonus Points do **NOT** Help Passing the Exam (4,3 Still Fails, Even if Bonus Points were Acquired)

- ~30 min: Review of Last Week's Exercises
 - Present your Solution of Last Week's Exercise
 - Talk about Encountered Problems
 - Get Additional 50% Points for the Exercise(s)
- ~30 min: Background of Current Topic
 - Presentation of What is Needed for Current Exercise Sheet
 - Participate and Ask Questions

- ~30 min: Begin with Exercises
 - Team Up in Groups (Max 3)
 - Discuss Current Exercises
 - Ask Questions if Anything is Unclear
 - Split Up Work
 - Start to Solve Exercises

- Upload by Monday on Digicampus
 - <https://digicampus.uni-augsburg.de/dispatch.php/course/overview?cid=a7637681e330b8bb243637b41ce78246>
- Submission by Monday Evening (Week after Upload) via Email
 - Always to manuel.milling@informatik.uni-augsburg.de
 - Also to thomas.wiest@informatik.uni-augsburg.de or alice.baird@informatik.uni-augsburg.de if Indicated on Sheet
 - Code as .py or .ipynb
 - Questions answered in Comments/Txt
 - Maths exercises: Hand-Written (Scan, Original)/PDFs(LaTeX),...
- Review in Tutorial (Wednesday) after Submission

Overview

- Subset of Machine Learning and Artificial Intelligence
 - Machine Learns to Solve Complex Tasks Based on Data
- Artificial Neural Networks (NNs)
 - Composition of Non-Linear Functions
 - 'Deep' Means Many Layers (Compositions)
- Very Successful in Many Applications

Topics

- Introduction to **Python** and **Numpy**
- Mathematical Background
- Implementing and Understanding NNs from Scratch
- Introduction to High-Level Library **Keras**
- Fundamental NN architectures: DNN, RNN, CNN
- Modern NN architectures/applications: GANs, AEs, ...
- Deep Learning Challenge