

LV 706.996 Human-Centered AI Research Seminar (Class of 2020/21)

(706.998 in Summer term 2021; also, for 706.996 and 706.999)

Professor Andreas HOLZINGER

Tutors Marcus BLOICE, Bernd MALLE, Anna SARANTI

Study Code: 066 921 Master program Computer Science

Semester hours: 3.0 h; ECTS-Credits: 5.0; Type: VU Lecture and Exercises with Python

ECTS-Breakdown (sum $\approx$ 125 h, corresponds with 5 ECTS, where 1 ECTS $\approx$ 25 h workload):

Activity	Breakdown	sum
Watching online lectures	5 * 2 h	10 h
Preparation before and reflection after lecture	5 * 2 h	10 h
Participation in online discussions	4 * 1 h	4 h
Reading and assignments	38 h	38 h
Preparation of assignments and final presentation	28 h	28 h
Review exercises	4 * 4 h	16 h
Writing exercise	14 h	14 h
Written exam quiz style	1 h	1 h
TOTAL students' workload	approx.	125 h

Class URL: <https://human-centered.ai/hcai-research-seminar-2020-21>

Background Due to the increasing availability of big data, increasing computational power and the great success in data-driven statistical machine learning, the field of Artificial Intelligence as a cross-sectional discipline for all application domains (from smart health to smart farming) is developing into a key discipline of our future society.

Rationale Research oriented students with a particular interest in human-centered AI and responsible machine learning will be prepared to become outstanding scholars in both industrial and academic research in the broad field of Human-Centered Artificial Intelligence and responsible machine learning in various application domains (e.g. smart health). One important skill set which students have to develop is the ability of carrying out innovative research. This includes to a large extent to learn from existing related work, to identify unsolved problems, to understand challenges and to propose and carry out inventive and effective approaches to problem solving and to be able to communicate and present their work to peers and finally to be able to write down their research and to identify and select established professional workshops, conferences and journals to publish their journals and conferences.

Goals The students will gain abilities to find relevant related work, to understand the development of a field, to determine the current state-of-the-art and to be able to critically

review current work. Having learnt these fundamentals students shall be able to conduct own research, identify the appropriate methods for application and to present a conference talk similar to a presentation at a workshop or conference. The final task is to prepare a paper on the basis of their assignments. Ideally, the topics fit together with the student's master practical, programming exercise and master's thesis.

This course will be adapted flexibly, with the ultimate goal of having each of the registered students working on his/her thesis related research project and present their research to the class.

Course Objectives Upon completion of this course, the students will be able to:

- Develop a general understanding of scientific thinking, mastery of the necessary tools, methods and approaches and being able to responsibly carry out research in the field.
- Understand current challenges in the field, determine current state-of-the-art research and have a sense to discover future research directions.
- Being aware of social, legal and ethical issues of current and future AI applications and develop ethical responsibility for the human-in-control of AI.

Evaluation The evaluation metrics include a) the review work, b) the oral presentation and the c) written mini paper. The evaluation and benchmark criteria can be found on the course homepage.

Class Schedule for 2020 (subject to change: please check class URL for any changes):

<i>Nr</i>	<i>Week</i>	<i>Topic</i>
01	41	Module 1: Introduction to Human-Centered AI
02	42	Module 2: The Fundamentals: Theory of Science
03	43	Module 3: The Mechanics: Management of Research
04	44	Module 4: Local Specifics
05	45	Reading tasks out + Assignments
06	46	Review tasks out
07	47	Module 5: Social, Ethical and Legal Aspects of AI Research
08	48	Review tasks presentation
09	49	Paper presentation
10	50	Course finalization and grading (detailed information will be given during the course)

For more information please visit the course homepage and for remaining questions please contact a.holzinger AT tugraz.at ☺