II2202: First group meet

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Agenda

- Deliverables
- Pair formation
- Choice of topic
- Time plan
- Feedback procedures
- Recommendation letters and references
- Shameless plug for Learning Machines course
- Master thesis topics, and relation to II2202 report
- Q&A

Course deliverables
(from Canvas)

- Project plan
- Presentation of your proposed research: Ethics & Sustainability
- First draft: Research plan
- Presentation and peer review draft project plans
- Qualitative exercise
- Quantitative exercise
- First draft of report
- Presentation and peer review of draft report
- Opposition before final seminar
- Final Seminar
- Final written report

Pair formation

- As of today, we have 30 students
  But...there are latecomers and dropouts…

- Find a partner within this group to form a pair

- Upload your pair to Canvas

- We will later form subgroups based on your topics,
  and set up an opponent structure within your subgroup

Students

67	x	Magnus	3	Alijani, Farid	AUSY	Autonomous Systems KTH	EAUSY21
68	x	Magnus	11	Arisoni, Abriansyah	AUSY	Autonomous Systems KTH	EAUSY21
69	x	Magnus		Barbu, Bianca - Elena		Data Science EIT	DASEU
70	x	Magnus		Chen, Shuyl		Visual Computing and Communication EIT	EVVCN21
71	x	Magnus	71	Chierchia, Remì	VCCO	Visual Computing and Communication EIT	VCCEU
72	x	Magnus		Ciovica, Emil Daniel		Data Science EIT	DASEU
73	x	Magnus	1	Culincu, Diana Cristina	VCCN	Visual Computing and Communication KTH	EVCCN21
74	x	Magnus	2	Demey, Lukas	AUSY	Autonomous Systems KTH	EAUSY21
75	x	Magnus		Demir, Ismet Erdern		Data Science EIT	DASEU
76	x	Magnus	20	Domínguez Sánchez, Paloma	HCID	Human Computer Interaction and Design EIT	HCIEU
77	x	Magnus		Gaspar Mendes, Joaquin		Data Science EIT	DASEU
78	x	Magnus	72	Geng, Jiaqi	VCCO	Visual Computing and Communication EIT	VCCEU
79	x	Magnus		Güner, Levent		Data Science EIT	DASEU
80	x	Magnus	0	Jain, Seema	AUSY	Autonomous Systems KTH	EAUSY21
81	x	Magnus		Javierre, Borja		Visual Computing and Communication EIT	EVVCN21
82	x	Magnus	98	Jin, Wanqi	VCCO	Visual Computing and Communication EIT	VCCEU
83	x	Magnus	7	Kheirkhahzadeh, Maryam	DASE	Data Science KTH	EDASE21
84		Magnus		Laso, Pablo		Data Science EIT	DASEU
85	x	Magnus	96	Li, Zilong	VCCO	Visual Computing and Communication EIT	VCCEU
86	x	Magnus		Liang, Junhui		Data Science EIT	DASEU
87	x	Magnus		Ling, Disen		Data Science EIT	DASEU
88	x	Magnus	4	Marthinsen, Fredrik	VCCN	Visual Computing and Communication KTH	EVCCN21
89	x	Magnus		Negrini, Marco		Data Science EIT	DASEU
90	x	Magnus		Perkowski, Ernest		Data Science EIT	DASEU
91	x	Magnus	5	Rehman, Abdul	DASE	Data Science KTH	EDASE21
92	x	Magnus		Segrt, Jovana		Data Science EIT	DASEU
93	x	Magnus		Sureshkumar, Piriya		Data Science EIT	DASEU
94	x	Magnus		Toscan, Nicola		Data Science EIT	DASEU
95	x	Magnus	69	Workinn, Daniel	DASE	Data Science KTH	DASE21
96	x	Magnus		Zhenghong, Xiao		Data Science EIT	EDASE21

▸	Magnus' group 1		0 / 2 students	⋮
▸	Magnus' group 2	👤 Ernest Perkowski	**Full** 2 / 2 students	⋮
▸	Magnus' group 3	👤 Daniel Workinn	1 / 2 students	⋮
▸	Magnus' group 4		0 / 2 students	⋮
▸	Magnus' group 5	👤 Zilong Li	**Full** 2 / 2 students	⋮
▸	Magnus' group 6	👤 Nicola Toscan	**Full** 2 / 2 students	⋮
▸	Magnus' group 7	👤 Jiaqi Geng	**Full** 2 / 2 students	⋮
▸	Magnus' group 8	👤 Shuyi Chen	**Full** 2 / 2 students	⋮
▸	Magnus' group 9		0 / 2 students	⋮
▸	Magnus' group 10	👤 Levent Güner	**Full** 2 / 2 students	⋮
▸	Magnus' group 11	👤 Xiao Zhenghong	**Full** 2 / 2 students	⋮
▸	Magnus' group 12	👤 Francesco Di Flumeri	**Full** 2 / 2 students	⋮

Choice of topic
Example sent in for approval

The current topic we have in mind is Real-Time Deepfake/spoofed audio detection.

Early 2019 there was a fake/spoofed audio detection challenge that provided a comprehensive dataset released by Google and other parties: https://www.asvspoof.org/

One of the results that followed from this dataset is the following article: https://medium.com/dessa-news/detecting-audio-deepfakes-f2edfd8e2b35
It shows a convolutional neural network that was able to distinguish deepfaked and real audio with good accuracy. The group has open-sourced their code. Additionally, they mention as one of the future research topics: "Build a low latency serving system to run in real-time." This is what we aim to do for our research project. We want to built a real-time deepfake audio detection system. This will likely be a simple web front-end that cuts up real-time audio into chunks, and sends those chunks to the backend periodically. This backend will classify this audio using the (adapted) model from the article and return the results.

More research has been done on fake audio detection (most using the same asvspoof dataset):
https://www.isca-speech.org/archive/Odyssey_2020/pdfs/29.pdf
https://arxiv.org/abs/1907.00501
https://www.researchgate.net/profile/Galina_Lavrentyeva/publication/319185301_Audio_Replay_Attack_Detection_with_Deep_Learning_Frameworks/links/5
Replay-Attack-Detection-with-Deep-Learning-Frameworks.pdf

We have not found any research focused on adapting the technology for real-time use.

Our plan would be to get some working version with results as soon as possible. Then we will see if we can work on improving the system. Mostly in regards to latency.

This is our current vision of the plan/methods. Obviously they are subject to change during the course of the project.

We are very interested about hearing your thoughts about this research topic.
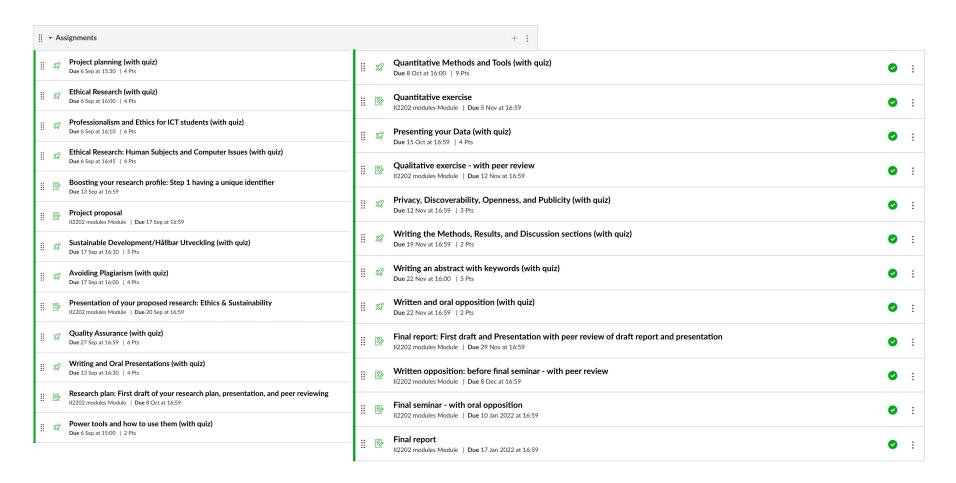
Time plan

- Sep 7   First group meeting (Zoom)
- Sep 28   Second group meeting (Zoom)
- Oct+Nov   Individually booked feedback sessions (Zoom, IRL)
- Oct 26   Third group meeting (Zoom)
- Nov 25   Dress rehearsal with 2-min reports (15-17)
- Dec TBC   Final seminar and oral examination ('full day')
- Jan 17   Final report written examination

Time plan – Assignments (from Canvas)

Assignments

Project planning (with quiz)	Quantitative Methods and Tools (with quiz)	✓
Due 6 Sep at 15:30 | 4 Pts	Due 8 Oct at 16:00 | 9 Pts	
Ethical Research (with quiz)	Quantitative exercise	✓
Due 6 Sep at 16:00 | 4 Pts	II2202 modules Module | Due 5 Nov at 16:59	
Professionalism and Ethics for ICT students (with quiz)	Presenting your Data (with quiz)	✓
Due 6 Sep at 16:10 | 6 Pts	Due 15 Oct at 16:59 | 4 Pts	
Ethical Research: Human Subjects and Computer Issues (with quiz)	Qualitative exercise - with peer review	✓
Due 6 Sep at 16:45 | 4 Pts	II2202 modules Module | Due 12 Nov at 16:59	
Boosting your research profile: Step 1 having a unique identifier	Privacy, Discoverability, Openness, and Publicity (with quiz)	✓
Due 13 Sep at 16:59	Due 12 Nov at 16:59 | 3 Pts	
Project proposal	Writing the Methods, Results, and Discussion sections (with quiz)	✓
II2202 modules Module | Due 17 Sep at 16:59	Due 19 Nov at 16:59 | 2 Pts	
Sustainable Development/Hållbar Utveckling (with quiz)	Writing an abstract with keywords (with quiz)	✓
Due 17 Sep at 16:10 | 5 Pts	Due 22 Nov at 16:00 | 5 Pts	
Avoiding Plagiarism (with quiz)	Written and oral opposition (with quiz)	✓
Due 17 Sep at 16:00 | 4 Pts	Due 22 Nov at 16:59 | 2 Pts	
Presentation of your proposed research: Ethics & Sustainability	Final report: First draft and Presentation with peer review of draft report and presentation	✓
II2202 modules Module | Due 20 Sep at 16:59	II2202 modules Module | Due 29 Nov at 16:59	
Quality Assurance (with quiz)	Written opposition: before final seminar - with peer review	✓
Due 27 Sep at 16:59 | 6 Pts	II2202 modules Module | Due 8 Dec at 16:59	
Writing and Oral Presentations (with quiz)	Final seminar - with oral opposition	✓
Due 13 Sep at 16:30 | 4 Pts	II2202 modules Module | Due 10 Jan 2022 at 16:59	
Research plan: First draft of your research plan, presentation, and peer reviewing	Final report	✓
II2202 modules Module | Due 8 Oct at 16:59	II2202 modules Module | Due 17 Jan 2022 at 16:59	
Power tools and how to use them (with quiz)		
Due 6 Sep at 15:00 | 2 Pts		

Feedback procedures

1. You write and hand in, via Canvas, before deadline
2. I read and give you (devil's advocate) feedback:
   - In writing (commented PDF, tracked changes in Word,...)
   - Orally (at scheduled meetings, IRL or Zoom)
   - By marking your hand-ins in Canvas (possibly commenting)
3. You revise or refine or rewrite

Recommendation letters and references

Simple rule:

If you get graded A on the course,
then I will write recommendation letters for you
(upon request from the place you apply to, no generics) or provide references for you
(meaning the place you apply to can call me up)

Learning Machines
(IK3616 / ID2225)

- Open to master students that know
  - machine learning
  and are not afraid of
  - mathematics
  - statistics
  - artificial intelligence

- Runs in P4 (starts late March, 2022)

- If you want the schedule and reading list before course starts, email me: mab@kth.se

Master thesis opportunities
(Examiner, supervisor)

1. Research projects on
   - Learning Machines for Internet Psychiatry (KI)
   - Emotion tracking in the human face (SU)
   - Precision Medicine (KI+hospital)

2. Theoretical research on analogue computing
   (reservoirs, echo state networks, liquid state machines)
   Case example: Epilepsy and magnetoencephalography

3. Applied Life Science project, e.g. rare diseases, MS, lung cancer, depression, panic syndrome, social phobia, bipolar disorder

4. External applied/industry machine learning project

1-3 are typically not paid short-term, but give you freedom

Questions!?

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