Master introduction Artificial Intelligence

Floris Bex

AI Programme coordinator

Welcome!
AI introduction

Monday 7 February (BOLOGNALAAN 101- 1.204)

14:00 Welcome – Mehdi Dastani
14:15 AI introduction presentation – Floris Bex
14:45 *Break*
15:00 Introduction to the areas of AI – Area coordinators
15:45 General questions
16:00 Introduction student ambassadors
16:05 Drinks & chat
16:30 End

Important info and contacts

- Website for students: https://students.uu.nl/en/science/artificial-intelligence
  - Courses
  - Schedules
  - Thesis info

- Contact for students:
  - Floris Bex (programme coordinator - coordinator-ai-master@uu.nl)
    - Questions about contents of the programme, allowed external courses, thesis opportunities and supervisors, study paths etc.

What is AI?

- Acting humanly
- Thinking humanly
- Thinking rationally
- Acting rationally

AI in Utrecht

- Human-centered AI Focus Area
  - Science – Information and Computing Sciences
  - Humanities – Philosophy & Linguistics
  - Social and Behavioural Sciences – Experimental Psychology
  - Geosciences, Veterinary Sciences

- AI Labs

Police Lab AI

AI & Mobility Lab

AI & Sustainability Lab

AI & Media Lab

AI in Utrecht – Programme Organisation


Dastani


Bex


Yolum

- Organised by the Graduate School of Natural Sciences (Faculty of Science)

- Programme Leader: Mehdi Dastani
- Programme Coordinators: Floris Bex (active students), Pinar Yolum (admissions)
- Programme council: Rosalie Iemhoff, Martijn Mulder, Tejaswini Deoskar


Iemhoff


Mulder


Deoskar

Areas of AI in Utrecht

- Agents
  - Understanding & modelling artificial agents and multi-agent systems
- Cognitive Processing
  - Understanding & modelling human cognition using computational tools
- Natural Language
  - Understanding & modelling linguistic behaviour using computational tools
- Reasoning
  - Understanding and modelling reasoning using computational tools

- All this may involve machine learning

Area Representatives

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- Agents
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Area Representatives


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- Computer science
  - Engineering, algorithms & systems
- Experimental psychology
  - Experimentation, algorithms & the human brain
- Linguistics
  - Experimentation, language processing, logic & language
- Philosophy
  - Mathematics, logic & philosophy


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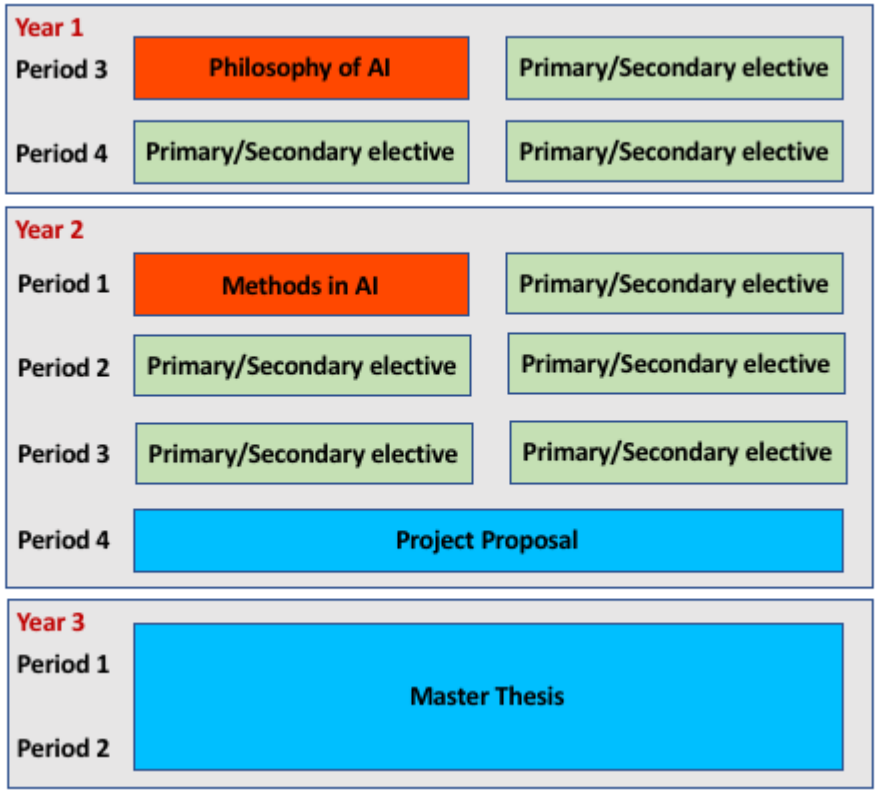
Programme structure



Programme contents

- Mandatory courses (2 + 2 mini – 16 EC)
- Primary elective courses (4 – 30 EC)
- Secondary elective courses (4 – 30 EC)
- Master Thesis (7-9 months, 44 EC, counts as ±6 courses)

Mandatory courses

- Philosophy of AI
  - introduction to AI ideas, theoretically oriented
  - Period 3
- Methods in AI research
  - introduction to AI research methods, practically oriented
  - Period 1
- Introducing natural sciences & Dilemmas of the scientist
  - 0.5 EC mini-workshops in 1st and 2nd week
  - 0.5 EC workshop in second year (please register via Osiris)

Primary electives

- Intelligent Agents
- Multi-Agent Systems
- Multi-Agent Learning
- Social Computing
- Evolutionary Computing
- Machine Learning for Human Vision and Language
- Advanced Machine Learning
- Natural Language Processing
- Human-centered Machine Learning
- Logic and Computation
- Logics for Safe AI
- Logic and Language
- Computational Argumentation
- Cognitive Modeling
- Experimentation in Psychology and Linguistics
- Data Mining
- Pattern Recognition

Primary electives

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- Logics for Safe AI
- Logic and Language
- Computational Argumentation
- Cognitive Modeling
- Experimentation in Psychology, Linguistics and AI

Secondary electives

- Primary electives
- Courses in other master programmes: Business Informatics, Computing Science, Game and Media Technology, Human-computer Interaction, Linguistics, Neuroscience and Cognition, Philosophy
- Research Internship
- Other master courses within or outside the UU (subject to approval)
- One deficiency bachelor course (only if specifically mentioned in admission letter)

Secondary electives

- Computing Science, e.g. Probabilistic reasoning, Evolutionary Computing, Data Mining, Pattern Recognition (also primaries)
- Game and Media Technology, e.g. Multimedia Retrieval, Crowd Simulation
- Human-computer Interaction, e.g. Natural Language Generation, Adaptive Interactive Systems
- Neuroscience and Cognition, e.g. Neurocognition of memory and attention, Advanced cognitive and social psychology
- Linguistics, e.g. Reasoning about meaning in linguistic communication, Natural Language Generation
- Philosophy, e.g. Digitial Ethics, Philosophy of the Mind
- Business Informatics, e.g. Software architecture, Entrepreneurship

Master Thesis

- Large Thesis project
  - ¾ of a study year (7-9 months) dedicated to thesis, opportunity to do real research
  - Possibility to spend time at a company/organization during the thesis (work experience, stage)

- Internally (UU) or external internship (company, other uni)
  - Germany, Sweden, Italy, USA, Australia, …
  - TNO, Philips, Police, Oddity, NS, ING, ProRail, Kluwer

Master Thesis

- Large Thesis project
  - ¾ of a study year (7-9 months) dedicated to thesis, opportunity to do real research
  - Possibility to spend time at a company/organization during the thesis (work experience, stage)

- Choosing a project:
  - Start preparations at least one period before you want to start
  - Ask lecturers of courses that you find interesting
  - Contact AI coordinator

Research internship

- Note there are 2 types of internship: one connected to the Thesis project (INFOMAI1 and INFOMAI2) and an optional “internship course” (INFOMRIAI)
- Research internship course only available if you can find a UU-lecturer who wants to supervise you.
- For both: please ask around for UU supervisors first before you enter into a contract with a company/external organisation!

Practical information – general info

- AI webpages for current students:
  - http://students.uu.nl/en/science/artificial-intelligence
- Policies and procedures
  - https://students.uu.nl/en/science/artificial-intelligence/practical-information/academic-policies-and-procedures
  - OER (exam regulations) is an important document
    - OER Annex AI is the only document that has legal force when choosing courses

Practical information – study guide & courses

- Study guide with links to courses:
  - students.uu.nl/en/science/artificial-intelligence/academics/study-programme/curriculum
- OSIRIS course catalogue
  - osiris.uu.nl/osiris_student_uuprd/OnderwijsCatalogusZoekCursus.do
- None of these are binding:
  - Check the OER, AI appendix at the start of each year

Practical information – Osiris & Blackboard

- Use OSIRIS for course enrollment, reviewing your results, etc.
  - osiris.uu.nl
- Use Blackboard for information on specific courses
  - uu.blackboard.com
  - Slides, assignments, deadlines etc etc
  - Some courses have a separate website

Practical information – schedules and enrolment

- Year schedule (exam weeks, holidays, enrollment deadlines etc.)
  - https://students.uu.nl/en/science/artificial-intelligence/academics/schedules
- Please be aware that some faculties work with 2 semesters instead of 4 terms
- Enroll for the courses you want

Practical information - contacts

- Programme coordinator Floris Bex
  - Coordinator-ai-master@uu.nl
  - Questions about the contents of the programme, study paths, thesis projects
- Student Information desk:
  - science.gsns@uu.nl, 1st floor in the main hall of the Minnaert building, room 1.20
  - Questions related to enrollment, Osiris, admin
- Study advisor
  - studyadvisor-mcis@uu.nl
  - Questions about planning, regulations, personal matters

For now

- Break – ask general questions in chat of the Team
- Check out possible courses for this period
  - https://students.uu.nl/en/science/artificial-intelligence/academics/study-programme/curriculum
  - Enrolment details tomorrow morning
- Check out & join the HAI team (link)

Master introduction Artificial Intelligence

Areas of AI

Area Representatives

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Janssen

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Agents

- Intelligent systems
  - Rational agent approach: doing the thing, which is expected to maximize goal achievement, given the available information
- Artificial agents and the interactions between them
  - Knowledge representation & automated reasoning
  - Machine learning for agents
  - Hybrid systems
- Computer science viewpoint
  - Connections to Cognitive Processing (human interaction), Language (NLP), Reasoning (logic)

Agents - courses

- Intelligent agents
  - goal-based agent architectures, reasoning with knowledge
- Multi-agent systems
  - Agent interaction, negotiating agents, game theory
- Multi-agent learning
  - Adaptive agent interaction, game-playing (e.g. poker)
- Logics for Safe AI
  - Verifying and controlling agent behaviour
- Advanced Machine Learning
  - Reinforcement learning, causal inference
- Human-centered Machine Learning
  - Develop and assess fair and explainable machine learning systems

Computer Science - courses

- Data mining
- Pattern recognition
- Multimedia retrieval
- Evolutionary computing
- Computer vision
- Big data
- Pattern set mining

- Program semantics and verification
- Technologies for learning
- Crowd simulation

- Science-based entrepreneurship
- Requirements engineering, Software architecture

Think about your study path and the courses you want to follow

- Philosophy of AI
- Choose a second course
  - Computational argumentation
  - Experimentation in psychology and linguistics
  - Multi-agent systems

  - ...or any of the secondary electives (evolutionary computing, big data, natural language generation, software architecture, digital ethics)

Tomorrow

- Study plans and possibilities
- Live enrollment for period 3 (and 4)
- Homework: check the study guide with links to courses to get an idea about the possibilities
  - students.uu.nl/en/science/artificial-intelligence/academics/study-programme/curriculum

Questions?