Faculty of Science and Engineering

Profile report: Human-Centred Artificial Intelligence (mens-georienteerde artificial intelligence)

- Discipline: Artificial Intelligence
- Level: Tenure-track assistant professor
- Fte: 0,8-1,0 fte

1. Scientific discipline
The position focuses on the development of artificial intelligence systems that are explainable and responsible. Such systems should be able to make clear how it arrived at its conclusion (be it a decision, a suggestion, or similar), are abiding to ethical principles, and are tuned to the needs of the user of such systems, to create good collaborative outcomes. They support humans in tasks where humans are weak (e.g., pattern recognition in big data) and take advantage of human interventions where the system is weak (e.g., flexibility, or knowledge of the world).

2. Vacancy
This position is opened by the Board of the Faculty (ref. PT/gl/2100066*)* and will be embedded in the Bernoulli Institute, basic unit Artificial Intelligence. The criteria and conditions pertaining to the position are described in the document 'Assistant professor with an education profile'.

3. Selection committee (BAC)

Dr. F. Cnossen (Chair)	Director of Education Artificial Intelligence & Computational Cognitive Science
Prof. dr. N.A. Taatgen	Scientific director Bernoulli Institute and Professor Cognitive Modeling
Prof. dr. A. Lazovik	Director of Education Computer Science
Prof. L.R.B. Schomaker	Professor Artificial Intelligence
Prof. R. Verbrugge	Professor of Logic and Cognition
Dr. N. Degens	Lector User-Centered Design Hanzehogeschool
(student)	

HR advisor:
N.F. Clemencia-Lokai

4. Area of expertise
The original dream of AI was to build artificial systems that make life easier for humans around the house (robots vacuuming, cleaning, …) and at work (agriculture, factory work) so that we would have more spare time. While AI and robotics have developed, it became clear that (1) such goals were hard to achieve and that (2) many "algorithms" (as AI Machine Learning systems are often called) are being developed in isolation of the humans who will use the AI systems. This refers to a call for more transparent or explainable AI, but also for more responsible AI: in short, there is a call for human-centred intelligence (HCI).
HCI refers to artificially intelligent systems that are developed to be able to make clear how it arrived at its conclusion (be it a decision, a suggestion, or similar), is abiding to ethical principles, and tuned

to the needs of the user of such systems, to create good collaborative outcomes together with the human users of those systems. Such systems support humans in tasks where humans are weak (e.g., pattern recognition in big data) and take advantage of human interventions where the system is weak (e.g., flexibility, or knowledge of the world).

The societal impact of Artificial Intelligence is increasing, and with that an increasing demand of the job market for students who can combine technical AI skills with the ability to design and evaluate the collaboration between humans and machines. This requires an expert that can strengthen the BSc program in this area, increase the offer of MSc courses, and advise BSc and MSc projects. In addition, educational capacity is needed in university-wide initiatives in the area of AI and Digital Society. Because of the fast developments in AI, the position supports the continuous updating and innovation of education and research needed in this field of AI.

5. Embedding: institute (and base unit)

The Bernoulli Institute for Mathematics, Computer Science and Artificial Intelligence is part of the Faculty of Science and Engineering (FSE). The profile of the institute centers around modelling, computation, and cognition with a focus on science and technology, keeping a balanced mix of fundamental and applied aspects. The Bernoulli Institute comprises five mathematics research programmes, seven computer science programmes, and four artificial intelligence programmes. The constituting programmes participate in various national research schools and most of the PhD students are enrolled in an educational programme and take part in other activities offered by these schools. The Bernoulli Institute has a leading role in the cross-disciplinary research theme on Data Science and Systems Complexity (DSSC), in the Center "Groningen Cognitive Systems and Materials" (CogniGron) within the Faculty of Science and Engineering.

The candidate will work in either the Multi-Agent Systems group (led by prof. Dr. L.C. Verbrugge), or the Cognitive Modelling group (led by prof. N.A. Taatgen), both of which are part of the department of Artificial Intelligence of the Bernoulli Institute.

6. Local and (inter)national position

The Bernoulli Institute has expertise in Cognitive Engineering, Visualization, Cognitive Modeling, Multi-agent systems and Machine Learning. These provide the local context for the position. In addition, there are strong collaborations with the UMCG. Furthermore, the Bernoulli Institute will participate in the new Jantina Tammes school for Digital society, technology and artificial intelligence.

Within the Netherlands, there is a growing interest in human-centered AI as formulated in the NWO AI Research Agenda. Also the Gravitation project Hybrid Intelligence (a collaboration between six Dutch universities, with the Groningen AI department in a leading role) emphasises the topic. In addition, both the EU and the Dutch Government are expected to also invest heavily in this type of AI research.

Internationally, the BI collaborates with the Anderson group at Carnegie Mellon University, the Eliasmith group at the University of Waterloo, the Computer Science department at Drexel University (Philadelphia), the University of Liverpool and Oxford University, the Institute of Logic, Language and Computation of the University of Amsterdam, the Indian Statistical Institute, the University of Brescia, the Jagiellonian University Cracow and the cognitive modeling group at the Technische Universität Berlin, among others.

7. Expected contributions to teaching

The candidate is expected to contribute to our ambitious programmes by teaching courses in the domain of human-centred intelligence, and contributing to curriculum development in that area in

our degree programmes. The candidate should co-create an educational culture where AI and CCS students feel supported and teachers foster personal growth in students. Importantly, the candidate is expected to add to a supportive and collaborative environment between colleagues.

The candidate is expected to develop integrative courses that focus on both human users and AI systems within the BSc and MSc programmes in Artificial Intelligence, and the MSc program Computational Cognitive Science. These include Responsible AI (or Ethics), Explainable AI, or AI in Law or AI in Medicine; or Human-AI collaboration, Human-Robot interaction or Social Robotics. Courses taught in this position should be equally appealing to students of the MSc AI, who might want to study and reflect on the wider ranging aspects of AI in society, as for students in the MSc Computational Cognitive Science, most notably those in the specialization of Cognitive Engineering, who are interested in supporting professionals in Law or Medicine by AI/ML systems (e.g., diagnosing support systems). Many of these courses will be developed by the candidates themselves. The exact nature of the courses will co-depend on the expertise and interests of the candidate.

Another important part of these positions is supervising graduation projects in this area, which will often be done outside of academia (e.g., in the UMCG, in law, in business, or elsewhere).

A second aspect of the position is innovation in education. The candidate contributes to innovation of the current BSc and MSc curriculums in terms of Human-centred AI and adds courses to those programmes. The candidate may use more project-based or other teaching methods in their courses. Additionally, they support other staff members with integrating topics from more foundational courses (e.g., Cognitive Psychology, Knowledge Technology) with more applied examples (e.g., Decision support systems) and thus help innovating their courses and teaching. To support educational innovation, the candidate applies for grants that support innovation in teaching.

8. Expected contributions to research
The candidate develops their own line of research in one of the topic areas of human-centered AI, or contributes to an existing research line within one of the groups in AI. The institute has a number of research lines that the candidate can connect to. A first line is hybrid intelligence aimed at augmenting human intellect, human alignment and that supports responsible artificial intelligence. As second line of research is the application of cognitive models and machine learning in AI-supported education and applications to promote healthy aging. The candidate (co-)supervises PhD students, publishes in peer-reviewed journals, and applies for external research funding.

9. Expected contributions to the organization
The candidate is expected to have an active interest and to provide a positive contribution to the management and organizational tasks of the institute. At the level of FSE, the candidate will contribute to the organization of the faculty, for example by participating in working groups and committees in the area of education. The candidate will participate in relevant national and international organizations.