Faculty of Science and Engineering

Profile report: Tenure Track Assistant Professor in Artificial Intelligence - Machine Learning / Pattern Recognition

- Discipline: Machine Learning / Pattern Recognition
- Level: Assistant professor
- Focus: Research
- Fte: 0,8-1,0 fte

1. Scientific discipline

Artificial Intelligence (AI) is a scientific discipline that focuses on creating computer systems capable of performing tasks that typically require human intelligence, such as problem-solving, decision making, and learning from data. Machine Learning and Pattern Recognition are subareas of AI aimed at the development of algorithms and models capable of learning from data, recognizing patterns, and signal analysis. Tasks include image and speech recognition, recommendation systems, and predictive analytics.

2. Vacancy

This position is opened by the board of the Faculty of Science and Engineering in the context of the sector plans and will be embedded in the Bernoulli Institute, Department of Artificial Intelligence, Machine Learning group. The position falls within the framework of the faculty's career system Career Paths in Science and Engineering. As the focus domain of the position is research, the criteria of the career path with a focus on research apply. Please see the link for more information.

3. Selection committee (BAC)

Prof. dr. N. Taatgen (chair)	Scientific Director Bernoulli Institute for Mathematics, Computer Science and Artificial Intelligence
Prof. dr. M. Cook	Head of department Artificial Intelligence, professor of Computational Neuroscience
Dr. F. Cnossen	Education Director Artificial Intelligence & Computational Cognitive Science
Prof. dr. J.S. Dibangoye	Associate professor of Machine Learning
Prof. dr. K. Bunte	Professor of Machine Learning for Interdisciplinary Data Analysis
Prof. dr. C. Brune	Professor of Nonlinear Analysis, University of Twente, External member
TBA	Student member

Advisors:

Prof. dr. H.B. Verheij	Professor of AI and Argumentation
Prof. dr. L.C. Verbrugge	Professor of Logic and Cognition

Dr. A. Lubbe	Institute Manager
F. Postma, MSc	HR Advisor

4. Area of expertise

Recent developments within AI have revolutionised multimodal data processing (image, sound, language, process data, etc.). Applying specific methods requires a broad overview: How should algorithms be fitted into large, continuously running systems? What is the relationship between data-driven algorithms and the domain knowledge needed to facilitate machine learning processes and avoid anomalous (dangerous) system outputs? How can continual learning processes be safely embedded in working (industrial) systems? The intended position lies at the interface between mathematics, statistics, modern methods of machine learning, and 'data engineering'. This research offers interesting opportunities to connect the insights from AI/machine learning with both new mathematical insights as well as technical insights in the field of modeling large, complex systems.

5. Embedding: institute (and base unit)

The position will be embedded in the Artificial Intelligence department of the Bernoulli Institute. The department is organized as four research groups: Machine Learning, Human Centered Robotics, Cognitive Modeling and Multi-Agent Systems. This position will be embedded within the Machine Learning research group.

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 modeling, computation, and cognition with a focus on science and technology, keeping a balanced mix of fundamental and applied aspects. The Bernoulli Institute has research groups in mathematics, computer science and artificial intelligence that work together on three scientific challenges: 1. Persistent Complex Systems, 2. The Future of AI, and 3. Tomorrow's Software-Intensive Infrastructures. The institute participates 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 institute has a leading role in the cross-disciplinary research theme on Digitalization and in the Center "Groningen Cognitive Systems and Materials" (CogniGron) within the Faculty of Science and Engineering.

6. Local and (inter)national position

The Bernoulli Institute has strong collaborations with other faculties of the university and the University Medical Center, and participates in the Jantina Tammes school for Digital Society, Technology and Artificial Intelligence. The institute leads a large national NWA-ORC project, HAICu, directed at the development of algorithms for digital humanities and the cultural heritage. In addition, the institute has a leading role in the 10 year NWO Gravitation project Hybrid Intelligence (2019-2029), a national collaboration between Dutch universities. Within the Netherlands, there is a

growing interest in Artificial Intelligence as formulated in the NWO AI Research Agenda. Both the EU and the Dutch Government are investing significantly in AI research.
The Bernoulli institute has a strong international reputation in the area of Systems Theory, Dynamical Systems, Software Engineering and Cognitive AI, and collaborates with several international institutes, among which ETH Zürich, Stanford University, the University of Washington and Carnegie Mellon University.

7. Expected contributions to education

The candidate is expected to teach and develop relevant course modules within our ambitious BSc and MSc programmes in Artificial Intelligence, and our MSc programme Computational Cognitive Science. The candidate plays a role in developing education concerning their area of expertise. The exact topics of the course modules co-depend on the expertise and interests of the candidate. In a balanced AI programme, students need to grasp fundamental topics of machine learning and statistical pattern recognition in addition to the already existing deep-learning courses. The candidate will also supervise graduation projects in the BSc and MSc programmes. The candidate should co-create an educational culture where Artificial Intelligence and Computational Cognitive Science students feel supported and where teachers foster personal growth in students. Importantly, the candidate is expected to add to a supportive and collaborative environment between colleagues.

8. Expected contributions to research

The candidate is expected to initiate and develop an internationally leading research programme in the field of Machine Learning / Pattern Recognition. The research should have visibility on the national and worldwide levels and lead to publications in top journals and conferences. Further it is expected that the new professor will take a leading role in the field of Artificial Intelligence within the Netherlands. Obtaining substantial external funding for PhD projects is crucial. Supervision of PhD students is an important part of the research activities. The research is expected to strengthen the existing efforts in the field of Artificial Intelligence within the Bernoulli Institute, and should lead to a strengthening of the international reputation of the group and the institute.

9. Expected contributions to the organisation

The candidate is expected to have an active interest and to provide a positive contribution to the management and organisational tasks of the institute. The candidate will furthermore contribute to the organisation of the faculty, for example by participating in working groups and committees, in the domains of education, research and management. The candidate will contribute to relevant organisational activities on the national and international level.