

Three open PhD positions in machine learning at the KERMIT research unit

Diploma

MSc in Mathematics, Computer Science or Engineering

Job description

The Department of Economy, Science & Innovation of the Flemish government has recently decided to invest strongly in the research of artificial intelligence. The research unit [KERMIT](#) (Knowledge-based Systems), headed by prof. Bernard De Baets is pleased to be able to offer **three fully-funded Ph.D. fellowships** to further advance its machine learning research lines.

The three available projects are:

- **Extreme classification**, co-supervised by prof. Willem Waegeman (willem.waegeman@ugent.be): One often encounters situations where a probabilistic classifier is uncertain about the class label(s) for a given instance. It might then be beneficial to abstain from making a prediction and return a set of candidate labels instead of a single class. We will develop a general *decision-theoretic framework* that allows for partial abstention in large-scale and extreme classification problems, covering multi-class and multi-label classification problems, with or without hierarchy over the labels.
- **Pairwise learning**, co-supervised by dr. Michiel Stock (michiels.stock@ugent.be): Pairwise learning is a machine learning paradigm where the goal is to predict the properties of *pairs* of objects, e.g., recommending goods to users, or finding the personalized treatment for a disease. The goal of this project is to extend our existing framework to include new loss functions, capture uncertainty, and generalize to triple learning and beyond.
- **Metric learning**, co-supervised by dr. Bac Nguyen Cong (Bac.NguyenCong@ugent.be): Existing metric learning methods mainly focus on classical learning settings such as classification, dimensionality reduction, and ranking. Only a few of them tackle more complex problems such as multi-task learning, supervised clustering, and domain

adaptation. We explore metric learning for *complex learning tasks*, in particular for hierarchical classification, extreme classification, one-shot or zero-shot, and many others.

Background

KERMIT (acronym for Knowledge Extraction and Representation Management by means of Intelligent techniques) is a young interdisciplinary team of mathematicians, engineers and computer scientists, and it draws upon intelligent techniques resulting from the cross-fertilization between the fields of computational intelligence and operations research. The main focus is on mathematical and computational aspects of relational structures as knowledge instruments, with emphasis on the fields of fuzzy set theory and machine learning. KERMIT serves as an attraction pole for applications in the applied biological sciences, and serves colleagues in hydrology, ecology, bacterial taxonomy, genome analysis, integrated water management, geographical information systems, forest management, metabolic engineering, soil science, bioinformatics, systems biology, etc.

Job profile

We are looking for a highly motivated candidate with a passion for cutting-edge machine learning research.

Requirements

The ideal candidate for the position has the following profile:

- An MSc degree in Computer Science, Mathematics, Statistics, Physics, or equivalent – candidates from outside Belgium are welcome to apply.
- An interest for fundamental machine learning research, as well as practical applications.
- In-depth experience with at least one programming language (Matlab, R, Python, Julia, Java, etc.)
- Fluent in English (speaking and writing, as demonstrated by personal texts).
- Knowledge of Dutch is an asset, but not a must.
- Team player with good communication skills.

Start date

Beginning of autumn 2019.

How to apply

Send your c.v., a motivation letter, a copy of your MSc.-thesis and/or any relevant publications to Ruth Van Den Driessche (ruth.vandendriessche@ugent.be). Please indicate in the email for which of the three positions you are applying (can be more than one). The deadline is 30 September.

Feel free to mail the (co-)supervisor(s) to enquire for more information.