

PhD scholarships in machine learning

“Online learning algorithms for complex prediction problems”

Institute of Computing Science
Poznan University of Technology

The Laboratory of Intelligent Decision Support Systems at Poznan University of Technology is looking for a **PhD student** to join a research project on **machine learning theory** sponsored by National Science Centre in Poland under SONATA BIS grant programme:

Online learning algorithms for complex prediction problems.

The project assumes a close research collaboration with various institutions abroad, as well as trips to the top scientific conferences in machine learning.

The students enrolled in the project will receive an untaxed scholarship of **3000 PLN / month** for the duration of **39-42 months**. On the top of that amount, the candidates, after passing the entry exam, will be enrolled to 4-years PhD studies at Poznan University of Technology, during which they can apply for a standard PhD scholarship (around 1200-1500 PLN / month).

It is planned to hire two PhD students in the project.

Project description

The goal of the project is to develop and analyze new learning algorithms for complex prediction problems within a theoretical framework of online learning. Online learning studies algorithms which make repeated predictions based on the data appearing in a sequential order. The algorithms receive immediate feedback about each prediction and use this feedback to improve their accuracy on subsequent predictions. The framework makes no assumptions regarding the origin or the properties of the data, and henceforth online algorithms are robust and possess strong worst-case performance guarantees. The methods of online learning have already been successfully applied to a diverse range of practical problems. Impressive results include: scalable (trillions of features, billions of training examples) linear learning methods, state-of-the-art data compression software, mining of data streams, recommender systems, online advertisements, and many others. The study of online learning algorithms is thus an important domain in machine learning, and one that has deep theoretical insight as well as practical applications.

Within the online learning theory, we will consider several research problems: online learning of probability distributions with logarithmic loss function, online learning with matrix data and parameters, online multilabel classification, adaptivity of learning algorithms by automatic tuning of their learning rates, connections between online learning and boosting methods.

Requirements

1. Finished master studies (or about to be finished with thesis' defence before September 15th, 2017) in computer science, mathematics or related discipline.
2. At least basic understanding and interest in machine learning methods. Every completed course on machine learning is an advantage.
3. Familiarity with probability theory, mathematical statistics, calculus, linear algebra, algorithmics and basic optimization methods.
4. Fluent programming skills.

5. Motivation for doing theoretical research in machine learning.

6. Fluent English, written and oral.

The latest starting date for the project is October 2017. The candidates will also need to pass the entrance exam to be admitted to PhD studies at the Faculty of Computing, Poznan University of Technology. The exam will take place in late September 2017.

Additional advantages (but not required): any scientific achievements, including papers published in the scientific journals or at the conferences, scholarships, scientific awards, research experience, workshops, internships, participation in research projects, etc.

How to apply

The applications should be sent by e-mail to `wkotlowski AT cs.put.poznan.pl`.

The application should include:

- Cover letter explaining the intention to join the project, including the earliest starting date.
- CV, together with the list of published papers and other scientific achievements.
- Recommendation letters are not required, but very welcome (can be sent separately by a person recommending the candidate).

In case of any further questions, do not hesitate to contact me by my email address.

Project leader

Wojciech Kotłowski, PhD

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