PhD scholarship in machine learning for real-time decision making using complex models

The AI Lab of the Vrije Universiteit Brussel invites applications for a PhD scholarship.

Context
The AI Lab of the Vrije Universiteit Brussel offers a strong research environment spanning a wide range of research topics such as reinforcement learning, game theory, natural language processing, evolution of speech, computational creativity, computational biology and knowledge representation and reasoning.

Research topic
The researcher will perform research in the context of decision making using a combination of reinforcement learning and complex models, under the supervision of prof. dr. Pieter Libin.

Many **real-world problems**, such as for example mitigating epidemics or optimizing agricultural processes, **involve complex decisions** that benefit from **automated decision support systems**.
In this project, we will investigate automated decision support systems with the goal to integrate these systems in the human decision process. To this end, we will investigate the use of model-based multi-criteria reinforcement learning algorithms in combination with fine-grained simulation models. The use of such models, that cover a set of realistic objectives, facilitates the learning of policies that can be intuitively conveyed to policymakers. This method enables real-time decision support (e.g., reacting to a virus outbreak) where the model can be continuously updated with observations from the real world (e.g., case incidence data) and accept multi-criteria feedback from human policy makers (e.g., recommendation was not fully accepted). We will evaluate the newly developed methods in the context of pandemic control, thereby making use of epidemiological models.

Qualifications
To be eligible to apply for this position, applicants need to have or be close to obtaining an MSc degree in computer science.
While we do not request prior experience in computational biology for this position, we expect applicants to be interested in this problem domain. The applicant should also be willing to work in a multidisciplinary environment, collaborating with computer scientists, clinicians, geneticists and psychologists.
Applicants must be strongly motivated for doctoral studies; should possess the ability to work independently and perform critical analysis, and also have good levels of cooperative and communicative abilities. They must also have a very good command of

English in writing and speaking, to be able to participate in international collaborations and to publish and present research results in international conferences and journals.

<u>Offer</u>
We offer employment as a full-time doctoral researcher.

As an employee of the Vrije Universiteit Brussel you will work in a dynamic, diverse and multilingual environment. Our green campus is located in the centre of Brussels, the lively capital of Belgium and Europe. Depending on your experience and academic merits you will receive a salary according to the official pay scales. Hospitalisation insurance and free use of public transport for travel to and from work are standard employment benefits. We have extensive sporting facilities which are at your disposal and a nursery is within walking distance. More information is available at the VUB job website.

Contract: full-time research grant for one year, renewable on an annual basis for a maximum of four years. Extension of the contract is subject to the agreement of the doctoral committee. Remuneration is at the level of a full-time research assistant at a Flemish university (i.e. approximately € 2.000 net per month) depending on personal situation, and includes contributions for social security.

<u>How to apply</u>
The PhD candidate will be selected on the basis of their expertise, work experience, and qualifications. There is no application deadline. Applications will be evaluated continuously and the position will be filled as soon as a good candidate is found. Please apply via e-mail to pieter.libin@vub.be, with a one-page motivation letter explaining the candidate's interest in pursuing a PhD on the chosen topic and a curriculum vitae listing all academic qualifications, relevant research experience and previous publications.