Date of publication of the job offer; May 7th 2020

PhD position at the Computational Science Lab (GRIB)

"Abstraction and reasoning challenge: Create an AI capable of solving reasoning tasks it has never seen before"

Job Description

Universitat Pompeu Fabra http://www.upf.edu/and Prof. Gianni De Fabritiis, ICREA research professor https://es.linkedin.com/in/gdefabritiis, are looking to recruit a PhD student for a PhD on AI. Lab website: http://www.compscience.org/

Relevant References: https://scholar.google.es/citations?hl=en&user=-_kX4kMAAAAJ&view_op=list_works&sortby=pubdate

Can a computer learn complex, abstract tasks from just a few examples?

Current machine learning techniques are data-hungry and brittle—they can only make sense of patterns they've seen before. Using current methods like reinforcement learning, an algorithm can gain new skills by exposure to large amounts of data, but cognitive abilities that could broadly generalize to many tasks remain elusive. This makes it very challenging to create systems that can handle the variability and unpredictability of the real world, such as domestic robots or self-driving cars. However, alternative approaches, like inductive programming, offer the potential for more human-like abstraction and reasoning.

The abstraction and reasoning corpus (ARC) provides a benchmark to measure AI skill-acquisition on unknown tasks, with the constraint that only a handful of demonstrations are shown to learn a complex task (https://www.kaggle.com/c/abstraction-and-reasoning-challenge). This competition was initially created by the creator of the Keras neural networks library and it's explained in this paper (https://arxiv.org/abs/1911.01547). The idea is to move beyond the competition timeframe to create an AI that can solve reasoning tasks it has never seen before and set up a path toward a PhD in AI. It is expected that novel work in terms of a paper should be produced during this period.

Project and Institution that finance the contract

The work is supported by grant: AEI-BIO2017-82628-P (FEDER/UE) DE FABRITIIS from the Spanish Ministry of Economy (MINECO), FEDER and Agencia Estatal de Investigación sources and Acellera (www.acellera.com).

Official number reference:

AEI-BIO2017-82628-P (Aplicación de métodos de aprendizaje automático y de aumento de datos en el estudio de la conformación proteica y el reconocimiento molecular para el desarrollo de fármacos)

Skills and Experience

- The candidate will preferably have a profile in computer science, physics or mathematics. However, we seek exceptional candidates with a passion for computing, the capability to think out of the box, the ambition to work in very innovative projects more than specific profiles.
- The capability to think out of the box, the ambition to work in very innovative projects and very good communication skills in English.
- Previous experience in reinforcement learning and related fields, Python proficiency and coding skills, knowledge of Tensorflow or pytorch, familiarity with Linux and the ability to work with version control systems (e.g. git) are required.

Benefits of the opening

The laboratory is located in the Barcelona Biomedical Research Park which, with a privileged location on the shoreline of the Mediterranean sea, constitutes one of the most exciting interdisciplinary research centres in Southern Europe with more than 1000 scientists in the building alone.

Facilities: Access to state of the art computational resources and large amount of simulation data, which will be crucial for the development and validation of novel computational protocols. The lab is equipped with a cluster with 60 GPUs and has exclusive access to GPUGRID.net, a distributed computing project with 5000 GPUs.

We offer a competitive PhD salary; final salary will depend on candidate background and experience.

Application:

Please send an email to **gianni.defabritiis@upf.edu** with subject **"JOB PhD1 2020"** with a CV and a cover letter together with the names of up to three contacts for requesting recommendations

Deadline – June 15th 2020