Universitat Pompeu Fabra Barcelona | Master in Bioinformatics for Health Sciences

Master project 2020-2021

Personal Information

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Project

Web development & bioinformatic tools

Project Title:

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

Keywords:

reinforcement learning; machine learning; inductive programming; AI

Summary:

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. For further details, contact Gianni De Fabritiis (gianni.defabritiis@upf.edu). The research period is paid. We are looking for exceptional candidates passionate about AI and with the willingness to go beyond in AI research. The lab is very well equipped.

References:

http://grib.imim.es/publications/index.php?CATEGORY1=14

Expected skills::

Be confident with maths and programming

Possibility of funding::

Yes

Possible continuity with PhD: :

To be discussed
