

We have several PhD openings in machine learning research for exploring methods to combine learning with process-driven modeling and simulations.

The successful candidate will enroll as a PhD student in the Computer Science department of the University of Geneva (under the co-direction of myself and Prof. Stephane Marchand-Maillet) and, at the same time, will become a member of the Data Mining and Machine Learning group (<http://dmml.ch>) as a research and teaching assistant at HES-SO, Geneva. The positions shall be filled in as soon as possible.

The interaction and cooperation between a simulator and a machine learning model can be exploited in a number of areas where data are expensive or difficult to obtain, and/or where domain knowledge within the process-driven models can back the inductive biases factored into the machine learning models.

In the medical domain, machine learning methods can be combined with neuromechanical simulators to develop models of human locomotion that shall support critical medical decisions related to surgical interventions treating pathological gait patterns. In industrial manufacturing, simulations and physical modeling of realistic or extreme operational conditions can support the learning of rare faulty behaviours in order to trigger early alerts. In chemoinformatics, an external system (e.g. RDKit) can provide relevant constraints for generating valid new molecules with specific required characteristics.

Related literature:

- Battaglia, Peter, et al. "Interaction networks for learning about objects, relations and physics." Advances in neural information processing systems. 2016.
- Lionel Blondé, Alexandros Kalousis "Sample-Efficient Imitation Learning via Generative Adversarial Nets." AISTATS 2019: 3138-3148
- Narayanaswamy, Siddharth, et al. "Learning disentangled representations with semi-supervised deep generative models." /Advances in Neural Information Processing Systems/. 2017.

We seek strongly motivated candidates prepared to dedicate to high quality research in the above domains for a number of years (the expected time to PhD graduation is 4-5 years). The candidate should have (or be close to obtaining) a Master's degree or equivalent in computer science, statistics, applied mathematics, electrical engineering or other related field with strong background in as many as possible (but at least some) of these: machine learning, probability and statistical modeling, mathematical optimization, programming and software development (preferably Pytorch and/or Tensorflow).

If interested, please send the following to alexandros.kalousis@hesge.ch

- academic CV (max 2 pages)
- academic transcript of the study results
- one page motivation letter explaining why the candidate is suitable for the position

- 500 word research proposal on one of the topics described above
- contact details of *three* referees (*do not* send reference letters)

The applications will be processed as they come as of now until the positions are filled. The status of the openings will be update here:
<http://dmml.ch/recruitment/>

In case of any further questions, please contact alexandros.kalousis@hesge.ch. I will also be in NeurIPS/Vancouver so ping me if you are around.