Call for Applications - Fully-Funded PhD Studies in Distributed Machine Learning

Ubiquitous computing, embodied in mobile and wearable computing, as well as numerous Internet of Things devices, enabled an unprecedented rate of innovation in the last two decades. The key facilitator of innovation in areas as diverse as online sign translation, over speech command interfaces, to autonomous driving, is deep learning. However, as deep learning branches out to new application domains, it becomes obvious that the traditional client-server paradigm, where a mobile/IoT device obtains results from a cloud-based deep learning model, cannot ensure the necessary real-time responsiveness, security, and resource efficiency requirements of future applications.

The Opportunity

KAUST and the University of Ljubljana (UL) are jointly working towards a new distributed deep learning paradigm that will ensure further proliferation of intelligent ubiquitous computing applications. Within this line of research, we are calling for applications for **a fully-funded PhD fellowship in the area of distributed machine learning**. The specific direction, guided by prof. Marco Canini (KAUST) and prof. Veljko Pejovic (UL), involves cutting-edge research on distributed (federated) deep learning and approximation techniques that will bring complex learning algorithms to a range of ubiquitous computing devices.

The post is for a fixed term of four years during which the candidate will be enrolled as a PhD student at KAUST and UL (details below). The offer includes the full coverage of the PhD studies tuition at both institutions and a competitive monthly living allowance/salary (ranging between $20,000-30,000 annual). During the time at UL, the candidate will be employed as a 50% research assistant and a 50% teaching assistant at a course closely related to the topic of the PhD research. During the time at KAUST, the candidate will be employed at 100% as a doctoral student supported with a KAUST scholarship. Prof. Canini's and Prof. Pejovic's respective labs are well equipped with the computing equipment (including mobile and IoT devices, server racks with GPUs) needed for the project. Additional funds are available for conference travel and open access journal publications within the scope of the PhD research.

The Institutions

Founded in 2009, King Abdullah University of Science and Technology (KAUST) is a private research university located on the shores of the Red Sea in Thuwal, Saudi Arabia. KAUST is the first mixed-gender university campus in Saudi Arabia and uses English as the official language of instruction for research and graduate programs. The university ranked 8th among the fastest rising young universities (aged 50 and under) in 2019. With over 100 different nationalities living, working and studying on campus, KAUST has brought together the best minds and ideas from around the world with the goal of advancing science and technology through distinctive and collaborative research. The Computer Science program at KAUST contributes to creating computational infrastructure and developing and applying computational methods to a variety of areas, spanning all aspects of knowledge extraction from big data to achieve economic prosperity and improve the quality of life. The **SANDS Lab**, led by Prof. Marco Canini, performs world-class research in the design, implementation, deployment, and analysis of large-scale networked systems. An important direction of the group is to develop system support to tackle the scalability, efficiency and robustness challenges of deep learning. **SANDS has in-depth expertise with creating advanced distributed deep learning systems**. The work done at SANDS regularly appears in top scientific venues such as SIGCOMM, OSDI, NeurIPS, ICLR, MLSys, VLDB, and EuroSys. More about the group can be found here.

University of Ljubljana is located in Slovenia, a European Union member state with a high quality of life and well preserved environment. University of Ljubljana is the best national and a strong regional educational institution. Faculty of Computer and Information Science (FRI) employs 170 research, teaching and administrative staff and enrolls approximately 1300 undergraduate and graduate students. The Faculty research, funded by EU, national and industry grants, is particularly strong in fields related to Artificial Intelligence, an area traditionally researched by our Faculty since the 1970s. In 2014 the Faculty moved to newly constructed $100 million premises in Ljubljana. **Mobile Computing research group** at UL FRI is specialising in efficient deep learning on mobile devices, compilers and distributed systems supporting energy-efficient approximate computing on mobile devices, and predicting and modelling human behaviour through data coming collected via mobile sensing. The group, led by Prof. Veljko Pejovic is persistently publishing at top ranked journals and conferences, with the research being supported by multiple national and international (EU) projects. More about the group can be found here.

The PhD Programme

A selected candidate will be enrolled at the PhD programmes of KAUST and University of Ljubljana, obtaining a double degree after successfully completing the studies. The expected duration of the studies is four years and the candidate is expected to spend roughly half of the time at each institution.

More info about the PhD programme at UL can be found in the brochure and PhD studies webpage.

More info about the PhD programme at KAUST can be found in the CS webpage and PhD studies webpage. This article reports on the experience of a visiting Slovenian student at KAUST.

The Candidate

A suitable candidate for this position should have:

- Academic background:
  - Master degree in computer science or a similar field (e.g. computer engineering, electrical engineering) with the minimum GPA of 3.2.
  - Strong mathematical and machine learning foundations;
- Technical skills:
  - Programming in C/C++, mobile programming languages (such as Java and/or Kotlin), and Python;
  - Familiarity with Linux OS and scripting languages;
- Communication skills:
  - Excellent command of English.

How to apply?

The programme starts with the fall semester on October 1st, 2022. There are up to two application deadlines: June 1st and August 1st (in case a suitable candidate is not found after the first application deadline). However, the candidates are urged to apply as soon as possible.

The application process is as follows:

1. Express your interest by contacting dr. Veljko Pejovic (veljko.pejovic@fri.uni-lj.si) with your CV and a brief motivational letter (up to one page, describing why you should be considered for this position)
2. Formally apply to the UL FRI doctoral programme (instructions at: https://www.fri.uni-lj.si/en/study-programme/computer-and-information-science-1)

For any further enquiries about the post, please contact dr. Veljko Pejovic (veljko.pejovic@fri.uni-lj.si).