The University of Queensland - IIT Delhi Academy of Research Joint PhD Project

Project title	**Systolic and semi-systolic architectures for intelligent sensor data processing on FPGAs**
Project code	**UQIDAR 00196**
Project description	After a long hiatus, systolic and semi systolic architectureson FPGA-based platforms have suddenly come back into prominence. The main reason is that almost all learning based algorithms use such architectures. The aim of this project is to design fast online learning algorithms for processing data from a large array of sensors in real-time. This is at the moment and often a difficult problem, because it takes a lot of time and energy to train deep neural networks.However, in this project we would like to develop algorithms that are much faster in such tasks and that can rapidly adapt (retrain) networks to a change in the input. The sensors that we shall be considering will be reasonably generic in nature varying from cameras to distributed motion sensors.
Project outcomes	1)FPGA based designs of RNNs (recursive neural networks) that can quickly train on new data. 2) Parallel algorithms for sensor fusion (application to sensor arrays, and self-driving cars). 3) FPGA-based autoencoders that are faster than the state of the art.
Advisory team	**UQ Principal Supervisor** **Dr Chamith Wijenayake** Information Technology and Electrical Engineering c.wijenayake@uq.edu.au https://scholar.google.com.au/citations?hl=en&user=MlcUYwkAAAAJ **IITD PrincipalSupervisor** **Associate Professor Smruti Sarangi** Computer Science & Engineering srsarangi@cse.iitd.ac.in http://www.cse.iitd.ac.in/~srsarangi/
Type of student	Applications are open to: I or q students who meet eligibility criteria.
Discipline background of student	Ideally, this project requires students with a background in: electronics or computer engineering.
Ideal candidate	**Essential Capabilities:** Knowledge of electronics engineering or computer engineering. **Desirable Capabilities:** Familiarity with digital system design and FPGA based systems. **Expected qualifications (Courses/Degrees etc.):** Bachelors or Masters Bachelor's degree in Electrical and Computer Engineering, Electrical Engineering.
Application process	Apply online by the due date: https://www.uqidar.org/students/how-to-apply/