**PhD Project Proposal**

School of Electronics, Electrical Engineering and Computer Science

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| **Proposed Project Title:** Meta Learning for Deep Reinforcement Learning |
| **Principal Supervisor: Vien Ngo Second Supervisor: Neil Robertson** |
| **Project Description:**  Human is very good at learning new tasks, even only at the first sight before giving the first trial. What makes human have such excellent generalization ability is that he has learnt and mastered many closely related tasks previously. Though with a very impressive recent development, artificial intelligence, e.g. deep learning in AlphaGo Zero, zero-shot learning, has not yet been able to be any close to such a learning/generalization level. Similar to a human, we expect an AI agent that should learn new tasks more efficiently after it has learned many tasks already. This is very closely similar to multi-task learning where the agent receives a large repertoire of multiple tasks to learn.  In this project, we investigate the promise of meta-learning for the use in deep reinforcement learning and robotics. An DRL agent or a robot is expected to use past experiences to simply achieve a much more data-efficient learning strategy. Our very first step is to use deep learning techniques, i.e recurrent neural networks, to train a meta DRL controller. Moreover, we will tackle this problem as generally as possible by addressing some notorious problems in meta-learning such as: design of task distribution, meta-overfitting, and model-agnostic. |
| **Contact details**  Supervisor Name: Vien Ngo Tel: +44 (0)28 9097 1824  QUB Address: 03-032 CSB Email: v.ngo@qub.ac.uk |