

# Thesis Progress Form

## CHARLES DARWIN UNIVERSITY

### College of Engineering, IT, and Environment

**Name:** Shane Reynolds

**Unit:** ENG720

**Title:** Automatic generation control of a two area power system using deep reinforcement learning

**Supervisors:** Charles Yeo & Stefaniya Klaric

**Time & Date:** May 22, 2020 @ 11am

## 1 Progress since last meeting

- Finalised implementation of environment in OpenAI class structure
- Implemented DDPG controller class, and Pytorch neural network models
- Conducted 11 experiments modifying DDPG hyperparameters and reward function to train the model effectively
- Discovered that the reward function is an important factor in the agent's ability to learn effectively — a simpler reward function is better
- Discovered that the OU noise process used for state-action space discovery can be detrimental to agent learning — reduced noise signal improves agent learning for this problem domain
- Researched a decaying noise process that may improve learning further (have not yet implemented)
- Research prioritised replay buffer may improve learning (have not implemented yet)



- Discovered that the problem environment is very unstable and highly sensitive to control actions — learning is improved by clipping the magnitudes of the control actions.
- Worked on and completed poster

## 2 Discussion Points

- CY provided feedback on poster for SR to implement
- Discussed research and interim report

## 3 Plan until the next meeting

- Submit poster
- Finalise interim report

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**Supervisor**

May 22, 2020