Joe Down

Computer Science Graduate

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Experience

Jun 2023– Aug 2023 **Software Engineering Intern**, *Sky*, London
- Used PyTorch to train a tennis live-stream event detector based on 'Multi-modal Self-Supervision from Generalized Data Transformations'.
- Sorted and extracted appropriate training data from available match footage (serve, rally, foul, etc.).
- Integrated with score detector from previous internship to produce a unified detector with additional optimisations and validation.

Jun 2022– Sep 2022 **Software Engineering Intern**, *Sky*, London
- Developed automated score detectors for Premier League football and tennis matches using computer vision (OpenCV) and optical character recognition Python libraries.
- Implemented appropriate unit tests.
- Dockerised to run on an AWS EC2 instance, taking a live video stream as input and emitting appropriate event notifications to Amazon SNS.

2019–2020 **Tutor**, *Explore Learning*, High Wycombe
- Group and one-to-one English and Maths tutoring for students ages 4-16.
- Taught small group 11+ exam preparation classes.

Education

2020–2024 **MEng Computer Science**, *University College London*, First Class Honours
- **Optional Modules:** Intelligent Systems, Artificial Intelligence and Neural Computing, Computer Graphics, Machine Learning and Neural Computing, Robotic Systems, Supervised Learning, Applied Machine Learning, Virtual Environments, Multi-agent Artificial Intelligence, Robotic Systems Engineering, Machine Vision
- **Key Projects:**
  - **Year 3 Group Research Project:** *Parameter-Wise Double Descent - A Unified Model or Not?*
    - Investigated and questioned the ubiquity of the double descent phenomenon by training a range of neural networks on the MNIST dataset.
  - **Year 4 Individual Project:** *WebMGA 3.0.*
    - Web tool for interactive 3D visualisation of molecular configurations for liquid crystals.
    - Developed using Node.js, React, and three.js.
    - GitHub, Dissertation
  - **Virtual Environments Group Project:**
    - A tool for teaching and learning sign language using hand tracking in a networked VR environment.
    - Developed using Unity for Meta Quest 2 and 3 headsets.
  - **Multi-agent Artificial Intelligence Group Project:** *Identifying how agents behave in the 'Warlords' game environment when trained using multi-agent reinforcement learning.*
    - Implemented the 'Deep Q-Learning" algorithm to try to learn behaviours in the 4-player Atari game 'Warlords'.
  - **Double Descent Literature Review**
  - **Foveated Rendering Literature Review**

2012–2019 **Secondary School**, *The Royal Grammar School*, High Wycombe
- **A-Level:** Maths: A*, Computer Science: A*, Further Maths: A, Physics: B
- **GCSE:** 9, 9, 9, A*, A*, A*, A*, A, A, A, A, A

Projects

- **Deep Deterministic Policy Gradient Implementation:**
  - Implemented an algorithm based on 'Deep Deterministic Policy Gradient (DDPG)' for a range of gymnasium environments.
- **NixOS:**
  - Using NixOS as my primary OS since April 2024. My configuration can be found at the GitHub repo linked.
- **A-Level Maths Quiz:**
  - Implemented an A-Level maths quiz platform with automated question generation for my A-Level Computer Science coursework.

Skills

Programming	Python, JavaScript/TypeScript, C, C++, C#, Java, Bash, SQL, Haskell, WebGL, TeX
Frameworks	PyTorch, TensorFlow, Docker, Unity, Node.js, React, PyQt, Flask, Rospy, OpenCV
Tools	Git, AWS (ECS, EC2, S3, SageMaker), Jupyter, JetBrains IDEs
Systems	Linux (Arch, Nix, Debian), Arduino, Raspberry Pi, Windows, Meta Quest
Other	Professional Scrum Master I