ARJAV **POUDEL**

Computer Science · Machine Learning

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EDUCATION

University of Edinburgh
Edinburgh, UK

B.S.c. (Hons) Artificial Intelligence — *09/2022 -*

- **Relevant Courses:** Reasoning and Agents, Foundations of Data Science, Algorithms and Data Structures, Mobile Robotics

Grove Academy
Dundee, UK

Scottish Highers/Advanced Highers — *09/2020 - 06/2022*

- 5 A1s in Higher Maths, Physics, Engineering, Human Biology and English.
- A1s in Advanced Higher Maths and Physics, and A1 with Distinction for Biology - Scottish Baccalaureate Project.

PROFESSIONAL EXPERIENCE

UKAEA
Culham, UK

ML Engineer Summer Intern — *06/2024 - 08/2024*

- Developed an innovative ML solution for experimental validation in fusion technology, focusing on emerging physics-informed approaches.
- Engineered and deployed 'Icarus-Fusion', an open-source machine learning tool that revolutionises experimental validation processes on PyPI, potentially saving UKAEA in reduced physical testing costs.
- Implemented and optimised 4 diverse model architectures (MLPs, CNNs, GANs, PINNs) to predict discrepancies between simulations and ground truth experimental data.
- Explored the application of Physics-Informed Neural Networks (PINNs) in fusion-based validation.
- Achieved a 95 percent reduction in validation time and a 30 percent improvement in prediction accuracy compared to traditional methods.
- Developed statistical metrics crucial for assessing model-experiment agreement, enhancing the credibility of simulations used in fusion reactor design.
- Co-authoring a pending scientific paper on innovative physics-informed ML techniques for fusion technology validation, enabling UKAEA to reduce physical testing of fusion components by 40 percent, translating to significant annual cost savings.
- Accelerated the development cycle of fusion reactor components by 3-6 months, fast-tracking progress towards sustainable fusion energy.
- Contributed to UKAEA's goal of developing the world's first commercially viable fusion reactor, addressing global energy challenges.

HumanEd
Edinburgh, UK

Head of Computer Vision — *09/2024 -*

- Contributing to the development of an advanced bio-mimetic hand that utilises computer vision and deep reinforcement learning techniques to autonomously solve a rubik's cube.
- Head of the Computer Vision Team responsible for leveraging image classification, object detection and scene segmentation to deploy a generalised infrastructure capable of solving cube puzzles without the need for specialised sensors or modifications.
- Built upon a previous project by OpenAI that utilised sensor-embedded 'tricked cubes', demonstrating my ability to enhance and refine existing technologies to push the boundaries of what is possible.

PROJECTS

Facial Recognition Enabled ML Voice Assistant

- Designed and developed an AI voice assistant with facial recognition using OpenCV, GPT-3, and Flask
- Integrated computer vision techniques with NLP and leveraged server-side frameworks such as Flask to build end to end logic accessible via asynchronous request methods for smooth user experience.

Brain-Computer Interface Research

- Conducted research with the Human-Computer Interaction team at the University of St. Andrews to evaluate the potential applications of Brain-Computer-Interfaces (BCIs).
- Utilised key analytical metrics such as neuronal recording scale, spatio-temporal signal resolution, and surgical invasiveness, and earned a Distinction as part of my Scottish Baccalaureate in Science award

Nepali Handwritten Character Recognition System

- Developed model using convolutional neural networks in PyTorch to recognise handwritten Nepali characters, achieving over 97% accuracy utilising a limited training dataset.
- Built a software tool with a real-time handwriting recognition algorithm aimed to positively influence language learning and educational resources for underserved Nepali communities in the UK.

TECHNICAL SKILLS

- **Programming Languages:** Python, Java, C, SQL, Basic Swift, Javascript
- **Programming Frameworks:** PyTorch, openCV, Pandas, NumPy, Django, Matplotlib
- **Technologies:** Deep Learning, Computer Vision, Git, UNIX, GANs, CNNs, Scientific Computing, High-Performance Computing, Physics-Informed Machine learning, Deep Learning for Scientific Applications, CI/CD