



Centre for Al-Fundamentals

RAEng Google DeepMind Summer Internship Programme 2025

Project proposal

| Project Title | Machine Learning-Driven Analysis of High-Speed X-Ray Imaging |
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| | of Additive Manufacturing |
| Lead supervisor | Fan Wu |
| Project Description | Modern metal manufacturing, particularly additive manufacturing, involves complex transformations that impact product performance. However, the opacity of metallic materials prevents direct observation of internal changes. High-speed X- ray imaging enables the study of these processes, revealing internal flow behaviours and defect formation. Yet, analysing large volumes of time-resolved X-ray data remains challenging, as conventional methods rely on manual scripting and annotation. This project aims to leverage deep learning to automate image segmentation, facilitating efficient and accurate data analysis. Interns will develop and apply programming codes in Python within open-source deep learning frameworks to enhance image segmentation automation. Comprehensive guidance and datasets will be provided to test and implement the developed models. |
| | Learning Outcomes: 1. Technical Skills: Extend awareness in deep learning for image segmentation. Knowledge of high-speed X-ray imaging and its applications in manufacturing. Hands-on experience with Python and AI frameworks such as TensorFlow. 2. Research & Analytical Skills: Ability to apply artificial intelligence (deep learning) approaches for scientific analysis of image sequences. Understanding of AI-driven approaches for materials characterization. Experience in result interpretation and technical report writing. |
| | Work Plan: The internship begins with reviewing X-ray imaging, deep learning, and additive manufacturing literature while exploring datasets (weeks 1-2). It then focuses on developing a deep learning model for image segmentation, including data preprocessing, model training and refining (weeks 3-5). Finally, it involves case study development, result analysis, and report completion (weeks 6-7) |