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PAUL HILL

Machine Learning Professional

PROFESSIONAL SUMMARY

Expert in machine learning and signal processing as an engineer and team lead (projects including object detection, geospatial AI, image compression, and time series analysis). Expert in tools such as Python, Tensorflow, PyTorch, and Docker to innovate solutions such as environmental monitoring and threat detection analysis, while mentoring research teams and fostering cross-functional collaborations. Passionate about driving advances in AI technologies and committed to delivering impactful, scalable solutions for complex challenges.

Significant projects and outcomes have included:

- Led a team to optimise an AI model used by the US Navy while working for SeeByte to provide improved performance (judged independently using US Navy metrics). This resulted in a significant contract extension.
- Researched and implemented a mobile analytics platform (real time heatmap generation) for Samsung Research UK. Samsung are in the process of applying for a patent for my work.
- Led a team to define and implement an AI based financial regulation system for Cube Global. This system is now live and is used as a key component of their online and real time financial regulation monitoring.
- Designed a prototype AI based power grid analysis system for real time electricity load prediction for Enoda.
- Created an AI based early warning system for volcano monitoring utilising SAR satellite data for the earth science department at the University of Bristol.

Experience:

- AI and signal processing engineer for over 20 years.
- Led academic and industrial teams.
- Provided cross-functional support across departments and from senior management to engineers.
- Excellent communication skills: lecturing for over 10 years and publication of a textbook.

EMPLOYMENT HISTORY

SENIOR AI RESEARCH FELLOW/LECTURER **5/2003-12/2021, Feb 2024 – Present**

Bristol University. ***Bristol, UK***

Defined and contributed to a large range of AI and signal processing academic projects over 20 years within the areas of computer vision, image/video compression, geospatial AI, GenAI, LLMs, and time series analysis.

- Novel geospatial solutions for environmental monitoring through CNN-LSTM models: https://github.com/csprh/HABNetDatacubeExtraction
- Video compression, optimising H.264 and HEVC codecs while implementing AI-driven compression systems for enhanced performance.
- Ground-breaking image segmentation research across multiple domains, creating efficient algorithms for remote sensing and bio-imaging applications: https://github.com/csprh/TextureSeg
- Geospatial time series forecasting using LSTMs and Transformers, delivering practical solutions for satellite data analysis and ground deformation prediction.
- Complex wavelet transform implementations, establishing new methodologies for non-decimated dual tree analysis with documented GitHub repositories: https://github.com/csprh/NDDTCWT
- Lecturing in audio engineering: Published a textbook: https://www.amazon.co.uk/Audio-Speech-Processing
- Supervision of over 50 masters and PhD students.

SENIOR AI RESEARCH ENGINEER **Sep 2023 - Feb 2024**

Samsung Research UK (SRUK). ***London, UK***

Developed differentially private federated analytic models for heatmaps at scale (modelling billions of datapoints). Utilised tools including Pytorch, Tensorflow, Docker, Flower (for federated learning) and the SRUK GPU cluster.

- Project definition, research and implementation from inception to delivery to client.
- Leading the project and holding cross functional meetings with stakeholders.

LEAD AI RESEARCH ENGINEER **May 2023 - Sep 2023**
Enoda Ltd. ***Edinburgh, UK***

Developed an electrical grid power load modelling framework using multivariate time series analysis techniques (including transformers and SARIMA) combined with federated learning for transformer based processing.

MACHINE LEARNING LEAD (NLP) **Dec 2022 - Apr 2023**
Cube Global Ltd. ***London, UK***

Machine Learning manager (of 6 engineers) at financial regulation analysis company Cube Global. Utilised GCP based processing including VMs and Kubernetes front end.

- Language model analysis of financial regulation feeding into real time client alerts. These systems used LLM agents based on BERT.
- I oversaw the project migration from heuristic client alerts to AI/ML based analysis using state of the art LLMs.

MACHINE LEARNING TECHNICAL LEAD (VISION SYSTEMS) **Dec 2021 - Dec 2022**
SeeByte Ltd. ***Edinburgh, UK***

Lead engineer developing classification (Detectron2, RetinaNet etc.), image based GenAI (GANs, Diffusion etc.) and control (Reinforcement Learning) technology for vision applications.

- Tools included Pytorch, Tensorflow, TensorRT, Phabricator (for DevOPs).
- Team lead of 5 machine learning engineers.

SENIOR ENGINEER **May 2002 - May 2003**
Provision Communications Ltd. ***Bristol, UK***
RESEARCH ASSISTANT **April 1998 - May 2002**
University of Bristol: Department of Electrical and Electronic Engineering. ***Bristol, UK***
IT SUPPORT **March 1995 - April 1998**
Sustrans. ***Bristol, UK***

EDUCATION

PHD IN ELECTRICAL AND ELECTRONIC ENGINEERING: ***University of Bristol.*** ***2002***
MSC IN COMPUTER SCIENCE WITH DISTINCTION: ***University of Bristol.*** ***1997***
BSC IN COMPUTER SCIENCE, FIRST CLASS: ***Open University.*** ***1995***
MA IN CREATIVE MUSIC TECHNOLOGY WITH DISTINCTION: ***Bath Spa University.*** ***2006***

SKILLS

- Python [+Pandas, Scikit-Learn, Matplotlib etc.], Tensorflow, PyTorch, Java, C++, JavaScript, MATLAB.
- Project Management, Team Leadership, Statistical Analysis, Signal Processing, Time Series Analysis.
- Jira, Phabricator, Confluence, Cloud Computing (GCP, Slurm). Cloud Based MLOps, DevOps, CI/CD and Docker.
- Experience in taking AI-based products from conception to market.

LINKS:

Website: csprh.github.io, LinkedIn: linkedin.com, GitHub: github.com.

REFERENCES

David Bull, University of Bristol *(dave.bull@bristol.ac.uk)*; **Alin Achim**, University of Bristol *(alin.achim@bristol.ac.uk)*.

ADDITIONAL INFORMATION

PUBLICATIONS

Published 60 journal papers, conference papers, chapters, and a book. h-index of 20 with over 2100 citations: see Google Scholar page: scholar.google.com/citations?user=luxEujEAAAA

PATENTS

GB 050035.5: Interpolation-Free Sub-Pixel Accuracy Motion Compensation

COMMUNITY SERVICE

Organizing committee member for IEEE International Conference on Multimedia and Expo (ICME 2020), Organizing committee member of Picture Coding Symposium (PCS 2021), Journal and conference reviewer for IEEE Transactions