Giles Billenness

Machine Learning Researcher & Software Developer

Contact Info

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Skills

Experiance with:
Standard OOP: C++, Python, Java, Golang, R.

Machine learning: PyTorch, TensorFlow, Scikit-learn, Keras, spaCy, OpenCV, NumPy, Pandas, Matplotlib,

CNN, Transformers, Object Detection Classification and Segmentation models, Generative models, LLMs,

Quantized models, Fine-tuning Foundation models, Distributed GPU Acceleration, Prompt Engineering, Data Preprocessing, Feature Engineering, and Model Evaluation.

DevOps, CI/CD, Orchestration: Jenkins, Tekton, Ansible, SonarQube, Docker & Kubernetes, AWS, GCP, IBM Cloud.

Web: JavaScript, React & Carbon, Node.js, GraphQL, SQL & MySQL, MongoDB, Ruby on Rails, Flask.

Research skills: a proven ability to collaborate within a team on research projects, with a talent for analysing and evaluating appropriate research literature and with experience using HPC clusters.

Other:
Git & GitHub, Software development life cycle, Agile, Coding standards, Code reviews, Build processes, Linux, API's & JSON.

Publications

Published/Filed Patents:
- Browser Platform for Self-Hosting A Web Service, IBM, Jul 12, 2023
- Polarisation Multiplexing in Wi-Fi networks to Increase Bandwidth, IBM, May 24, 2022
- Encryption of IP Addresses Using DNS for Obscuring Hosts in the Prevention of DDOS Attacks, IBM, May 12, 2022
- Reverse Charging Packets for Internet Usage, IBM, Apr 19, 2022

Profile

An accomplished machine learning researcher and software engineer with a proven track record across both academia and industry. Recognised for top-tier academic performance and impactful contributions at IBM and UCL. I excel in designing, developing, and deploying cutting-edge AI solutions from research prototypes to scalable, production-grade systems. My expertise spans deep learning, NLP, generative AI, and modern DevOps practices, as evidenced by multiple patents, awards, and high-profile projects in LLM applications and biomedical imaging. Adept at cross-functional collaboration, agile problem-solving, and driving innovation, I am eager to leverage my skills to deliver transformative solutions in both research and product engineering roles.

Employment History

ML Researcher at UCL Institute of Ophthalmology, May 2024 – Present
- Joined as part of my MSc project under the supervision of Professor Pearse Keane (Keane AI Group) and Yukun Zhou, continuing after completion.
- Attending meetings, presenting & validating findings, and collaborating with researchers on papers using machine learning in the field of ophthalmology.

IBM International, Sep 2022 – Dec 2024
Software Developer – watsonx Code Assistant for IBM Z LLM team – from Jan 2024.
- Developed AI-assisted application modernisation tools for COBOL and Java.
- These services are provided via IBM Cloud and VSCode extension.
- Maintained microservices in a Kubernetes (K8s) cluster, deployed using Tekton CICD pipelines, with backend services in Node.js & Python, and frontend interfaces in Typescript (React.js).

Software Developer – ZaaS (IBM Z as a service) SRE team – from Sep 2022.
- Developed and maintained features and tooling in IBM cloud.
- Responsible for updating and configuring devices in our service, incident response, and client on-call.
- Built and deployed automated device health check & compliance scripts in Python and expanded front end dashboards in NodeJS to assist engineers in service diagnostics, resulting in reduced downtime.

IBM Open banking project: In a team, we created an API for a client-facing banking app adding open banking functionality (PSD2) in Java Spring Boot, deployed in IBM WebSphere Liberty, with a Tekton CI/CD pipeline and a front-end web app in React. Giving weekly presentations to key stakeholders.
ML reading group: Analysing SOTA papers and attending talks from companies and researchers.

Software Developer placement at IBM Southbank, Jul 2020 – Sep 2021
Rotation: DevOps, QA Automation Testing and Full Stack Development roles, gaining knowledge in industry-standard technology and development practices.
- **DevOps**: Created custom tooling in Golang for the teams on location, using GitHub & pipeline APIs. Maintained Ansible install scripts and CICD pipelines in Jenkins.
- **QA Automation**: Extended tests and data collection using the Kubernetes API in Java.
- **Development**: Created React components, GraphQL endpoints and refactored our main repository removing all bugs, security issues, and improving code quality.

Extra-professional and volunteering opportunities:
- Member of a patent group, giving pitch presentations to industry leaders.
- Represented IBM at university, giving talks and hosting a stand at the careers fair.

Education

UCL, MSc Data Science and Machine Learning, London Sep 2023 – Nov 2024
Grade: Distinction (75%)
MSc Project:
Predicting stroke within a 5-year window from retinal imaging (with ViT vision transformers) and text data with multi-modal and fusion-based approaches, in Python using PyTorch.
Statistical Natural Language Processing – (85%):
Improved C++ code generation in Large Language Models by leveraging compiler feedback with SFT and Direct Preference Optimisation, achieving significant gains in compilation success. Done in Python using PyTorch and unsloth quantised model training.
Applied Deep Learning – (78.1%):
Explored self-supervised learning for the semantic segmentation of animals using the MaskContrast approach, compared to supervised SegNet, on the iNaturalist and Oxford Pet datasets. Done in Python using PyTorch.
Engineering for Data Analysis 1 – (84.3%):
Developed a scalable ML pipeline in Ansible to predict 3D protein structures using 2 orchestrated models on distributed cloud (AWS). Also covered Apache Spark & HDFS.
Artificial Intelligence for Biomedicine and Healthcare – (76.6%)
Applied Machine Learning – (100%)

University of Surrey, BSc Computer Science, Guildford Sep 2018 – Jun 2022
Grade: Achieved First class honours (85% Valedictorian)
Dissertation (84%):
- Predicting systemic medical conditions using retinal images, using unsupervised and transfer learning with vision transformers.
- Using large-scale, real-world public datasets (EyePACS and the UK biobank).
- A model achieved equivalent performance to industry-standard research using a significantly smaller image resolution.
- Proved medical diagnosis from retinal images can be done, with fewer computational resources than previously thought.
- Validated theoretical research, showing potential structures for further research to discover biomarkers for disease.
- Project was done in Python, Pytorch, processed by using Surrey's HPC AI GPU cluster.

Deep learning and advanced AI (year 4) (80%, highest in the year):
- Project head and team's lead developer for experimenting and evaluating several SOTA object detection models.
- Model architectures were evaluated on classifying and segmenting road signs using the large-scale Mapillary dataset.
- Project presented in a 1hr viva format to senior researchers in the department.
- Done in Python using the MMCV framework. Processing was done using Google Cloud.

Computational Intelligence (year 4) (97%):
- Solved a multi-objective optimisation problem by implementing the elitist non-dominated sorting genetic algorithm (NSGA-II).
- Using this genetic algorithm to train a multi-layer neural network to approximate 2d mathematical functions.
- This project was done in Python using the DEAP framework.

Natural Language Processing (NLP) (year 4) (83%):
- Individually experimented with and evaluated Deep Neural networks and Transformers for name entity recognition (NER).
- As a team, created a chatbot for customers to create and manage bookings with a local cinema using NLP techniques.
- We hosted the chatbot using a custom web service. We did this project in Python, SpaCy, and Flask.

More information and projects on GitHub, LinkedIn, and my website (on GitHub).

Honours & Awards

Finalist (Top 6), ElevenLabs AI Agent hackathon, London, Feb 2025
- Developed and demoed an AI agent for senior citizens, that featured diary & memory management, browser navigation and passive biomarker monitoring.

The Department of Computing Prize for best performance, The University of Surrey, Jul 2022
- Received the award (£250) for the highest overall performance in any department programme out of a cohort of 190 students from the Department of Computer Science.

Professional Training Award - Highly Commended, The University of Surrey, Apr 2022
- Received the Professional Training Award - Trailblazer - Highly Commended, for performance during the professional training year from the Department of Employability and Careers.

2nd place, IBM Green Hackathon, IBM Southbank, Feb 2021
- For developing a carbon emissions product scanner, demo and presentation, in an undergraduate placement team.

Extra-Curricular Activities

President & Industrial Coordinator of the Computing Society at The University of Surrey, Jun 2019 – Jun 2021
President:
Chaired meetings, lead committee to plan and execute events and formed industrial relationships, such as
- Collaborating with Microsoft on improving the university's IT functionality.
- Increasing the active members to 150, an increase of ~30% on the previous year.
- Hosted charitable events throughout the year and donated proceeds of ~£200 to One Laptop per Child
- Hosted a social event with other societies and donated proceeds of ~£700 to SATRO

As the Industrial Coordinator:
Collaborating with external companies, organising a panel with Intel to provide students with CV and career advice.

Course Representative at The University of Surrey, Sep 2019 – Jun 2021
This involved liaising with the head staff of the computer science department, ensuring that students' opinions about the course are heard and changes are made to reflect the desires of the student body.

Competed in the NSE and NUEL at The University of Surrey, 2018/19
I represented my university in the NSE and NUEL E-sports leagues.

Mission Discovery Space & STEM Summer School at ISSET, KCL, 2016/17
Collaborated with a team to create a unique experiment and present it to a panel of experts at KCL so it could be sent to the international space station. I competed twice, in 2016 and 2017.

Participated in IBM's Quantum Experience, London May 2016
I used a set of IBM's quantum processors (five-qubit) and matching simulator, interacting through the quantum composer.

Hobbies

Team-based & story driven video games, tech & computer hardware, machine learning, quantum physics and cooking.