James Wu

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WORK EXPERIENCES

UNIVERSITY COLLEGE LONDON — London, UK
Research Assistant — *June 2022 - Present*
Generalised Variational Inference for Gaussian Processes
JAX, Flax, Optax

- Achieved linear-time learning objectives for **variational Gaussian processes** compared to cubic complexity approaches in existing literature
- Leveraged **generalised variational inference** (GVI) to prevent the KL divergence support mismatch of standard function space variational inference
- Developed comprehensive implementations available on **GitHub**

Integral Probability Metrics
JAX

- Explored kernel-based distribution discrepancies **maximum mean discrepancy** (MMD) and **kernel Stein discrepancy** (KSD)

REVOLUT LTD. — London, UK
Machine Learning Engineer *(Junior → Mid → Senior)* — *Aug 2019 - Sept 2022*
Global Card Issuance for Company Profitability
Pyro, PyTorch, BayesOpt, Airflow, GCP

- Maintained company profitability by optimising global card issuance to acquire interchange rebates of $100M+ per year
- Developed pipelines for **Gaussian processes** and **Bayesian optimisation** to forecast user activity, spending, and growth
- Published timeseries package to internal **PyPi** and used across the business (i.e. forecasted liquidity for Treasury Dept.)

Support Automation
PyTorch, MLflow, Elasticsearch, Scikit-Learn, Airflow

- Built semantic search and intent recognition of customer chat messages with **one-shot learning** and **transformer** sentence embeddings

User Personalisation
TensorFlow, PySpark, Airflow, GCP

- Developed **LSTMs** to predict spending behaviours on the user-level
- Clustered behaviours with **t-SNE** to guide personalised content delivery

UNIVERSITY OF TORONTO — Toronto, CA
Research Assistant — *Sept 2018 - Apr 2019*
NLP for Biomedical Text
PyTorch

- Achieved SOTA results for biomedical **named-entity recognition** (NER) through **transfer learning** and **multi-tasked learning** with **BERT**

ANALOG DEVICES INC. — Toronto, CA
Data Scientist *(Intern)* — *May 2017 - Aug 2018*
Power Optimisation for PPG Heart Rate Sensors
Embedded C, MATLAB

- Designed an optimisation algorithm that reduced sensor power consumption by 50% while maintaining the same signal quality

EDUCATION

UNIVERSITY COLLEGE LONDON
MSc. Computational Statistics & Machine Learning
Graduated First Class Honours

UNIVERSITY OF TORONTO
BASc. Engineering Science (Robotics Specialisation)
Graduated Honours

SOFTWARE SKILLS

Fluent: Python, Git, LaTeX

Proficient: Airflow, SQL, Docker, PySpark, GCP

Familiar: Kubeflow, MATLAB, C, Assembly

PUBLICATIONS

Generalised Variational Inference for Gaussian Processes (Msc. Thesis)

Power Optimization with Photoplethysmography Signal Quality Classification (ICASSP 2020)

Biomedical Named-Entity-Recognition (BASc. Thesis)

Robust Beat-To-Beat Detection Algorithm for Pulse Rate Variability (ICASSP 2018)

3D-Printed Neuronavigation Headset for Therapeutic Brain Stimulation (JNE 2018)

RELEVANT STUDIES

Approximate Inference
Unsupervised Learning
RKHS's in Machine Learning
Statistical Learning Theory
Convex Optimisation
Computer Vision
Supervised Learning
Algorithm Design & Analysis
Mobile Robotics & Perception