Ira Shokar

ira.shokar.uk i.j.s.shokar@maths.cam.ac.uk github.ira.shokar.uk Text in blue are links

Profile

- **Technical Skills**:
  - *Languages*: `Python` (experianced), `Julia` (beginner) & `C++` (intermediate). *Machine Learning*: `Tensorflow [Python]`, `PyTorch`, `Scikit-Learn`, & `GPy`. *Unix-like OS*: `Linux` user on both my PC [`Debian`] and iPad [`Alphine Linux`]. *Distributed Computing*: JASMIN, UCL High Energy Physics Linux Cluster, `AWS Batch`. `Git`, LaTeX.

Education

Pembroke College, University of Cambridge — **Cambridge, UK**
PhD. Applied Mathematics | Application of Artificial Intelligence — *Oct 2020 – Present*

- Awarded UKRI EPSRC funding to study at the CDT in the Application of Artificial Intelligence for Environmental Risks.
- Research Topic- 'Deep learning to predict dynamics on an inertial manifold of mid-latitude jet systems'.
  - Co-Supervised by Professors Peter Haynes & Rich Kerswell at DAMTP.
- **Areas of specialisation:**
  - Fluid Dynamics of the Climate, Earth System Modelling, Dynamical and Stochastic Dynamical Systems, Probabilistic Machine Learning and Inference, Data Science, Deep Learning, Cloud Computing.

University College, University of London — **Bloomsbury, London**
BSc. Theoretical Physics with 1st Class Honours — *Sept 2017 – July 2020*

- **Thesis:** 'Deep Learning Classifier Robustness for Neutrino Event Detection using Domain Adversarial Neural Networks'.
- **Relevant Modules:**
  - Theory of Dynamical Systems and Chaos, Computational Physics (I & II; `Python`), Computational Mathematics (`Mathematica`), Mathematical Methods (I, II, III, for Physics and Astronomy, for Theoretical Physics).

Tiffin School — **Kingston-Upon-Thames, Surrey**

- **4 A-Levels** : **A*** in Mathematics and Further Mathematics; **A** in Economics and Physics.
- **2 AS-Levels**: **A** in History and Physical Education and **10 GCSEs**: 6**A*** & 4**A** grades.

Research Experience

- **PhD Registration Report**- 'Data-Driven Exploration of Mid-Latitude Weather'.
  - Used a Autoencoder to explore whether a beta-plane turbulence model of tropospheric mid-latitude circulation lay on an internal manifold.
  - Looked to evolve the dynamics of the model in the reduced latent space, before exploring the variability of the system due to its stochastic parameterisation scheme. [`Python: Keras, Tensorflow; MATLAB`]
- **Group Project**- 'Quantifying the effectiveness of natural hazard preventions by using an LSTM to predict rainfall runoff in flood risk mitigation'.
  - Project to investigate the effectiveness of natural flood management interventions undertaken in the town of Shipston-on-Stour during 2017 to 2020 using an LSTM model. [`Python:Pytorch`]
- **Final Year Research Project**- 'Deep Learning Classifier Robustness for Neutrino Event Detection using Domain Adversarial Neural Networks'.
  - Applied a Domain-Adversarial Neural Network (DANN) to improve the performance of a Convolutional Neural Network (CNN) to classify neutrino interactions, for the analysis of neutrino oscillations.
  - The model produced was trained that is invariant to the differences in production mechanisms between the data sources (labeled Monte Carlo simulations used to train the classifier) and the detector data.
  - Supervisor- Dr Chris Backhouse [`Python:Keras, Tensorflow; C++:Root, NOvAsoft; Scientific Linux`].
- **Group project**- 'HPGe Detector Gamma Ray Spectroscopy' simulation of nuclear emission and detector interactions.
  - Supervisor- Prof Ruben Saakyan [`C++:GEANT4; Cent OS`].
- **Computational Physics Project**- 'Cellular Automata Model to Simulate Motorway Traffic Flow'.
  - Project involved building a Cellular Automata to simulate motorway traffic flows, in order to compare the similarities granular when traffic shockwaves arise.
  - The model was extended to contain different vehicles with different maximal speeds, blockages such as accidents or road closures to try and model a driverless car system.
  - Supervisor- Prof David Bowler [`Python`].

Work Experience

FTI Consulting **Aldersgate St, City of London**
Data Science & Analytics Summer Intern (*kyle.johnson@fticonsulting.com*) *July 2019 – August 2019*

- An 8-week summer internship applying data science pipelines in the form of: data wrangling and data cleaning (dynamic and static web-scraping, parsing structured data and regular expressions), storing large data sets, data mining and querying using `SQL` and applying analysis to search for anomalous activity, fraud and money-laundering.
- My main project involved creating a relationship and transaction graph network using [`Python`] and [`Neo4j`], applying various network analysis metrics to determine key players and clusters that may require extra investigation. This was used in conjunction with bank records in implementing fuzzy token matching as well as with anomaly detection models.

Machine Learning Hackathons

Developer Circles from Facebook **Rathbone Square, Fitzrovia, London**
UCL Hackathon Team (*president@ucltechsoc.com*) *December 2019*

- I was selected to represent UCL at the AI for Messenger Hackathon where we created a chatbot that returned the translated text from an image containing text in a different language.
- Used `Node.js` for the messenger front end, with `Flask` connecting to the `Pytorch` models, which comprised of a CNN to determine the locations of the words, an OCR CNN to recognise the text, and a translation neural network.

UCL Data Science Society Hackathon **Microsoft Reactor, City of London**
Winning Hackathon Team (*su-datascience@ucl.ac.uk*) *November 2019*

- Hackathon hosted by Microsoft and American Express to look at providing insight from their credit card customer datasets.
- I was part of the winning team, where we produced a solution concluding that that product personalisation for customer subsets could increase credit card growth while assessing potential credit default and delinquency risk.
- We conducted exploratory analysis through k-means clustering and build decision tree and random forest models using `Scikit-Learn` and the `Azure API`.

Arm Holdings **Peterhouse Technology Park, Cambridge**
Applied Machine Learning Insight Challenge (*shoko.ueda@arm.com*) *November 2019*

- I was part of the winning team that completed a `Python` debugging challenge applying an adaptive image filter to a webcam image using a CNN during an insight into the research being conducted by ARM in the fields of computer vision and natural language processing for mobile devices.

Non-Technical Roles

Pembroke College Graduate Parlour **Pembroke College, Cambridge**
President (*gp@pem.cam.ac.uk*) *June 2021 – Present*

- Elected to lead the committee of 12 members and sit on committee meetings with senior college fellows to shape the college experience for graduate students, current and future.

Pembroke College Graduate Parlour **Pembroke College, Cambridge**
Events Officer (*gp@pem.cam.ac.uk*) *October 2020 – June 2021*

- Elected to organise events, large and small, that will appeal to all aspects of the college community. This includes online events as well as following Covid protocols to ensure all in-person events are run safely and within guidelines.

University of London Halls **Lillian-Penson Hall, Tyburnia**
Resident Advisor (*derrick.chong@london.ac.uk*) *August 2019 – August 20202*

- My role as part of the Warden's team involves assisting the Warden in encouraging a supportive and harmonious living environment- promoting and monitoring residents' personal, mental and social welfare, other pastoral care, dealing with disciplinary issues & conflict resolution, and being in charge of organising the social life of the Hall.
- We organised events for residents of hall as well as the wider University of London halls and manage the Lillian-Penson JCR.
- Mental Health First Aid certified (MHFA), Eating disorder and suicide prevention awareness trained (BEAT, Papyrus), Equality, Diversity and Inclusion trained (Definitely Able, All Sorts), Physical First Aid certified (British Red Cross), Fire Safety Awareness & Fire Marshall trained (Health & Safety, University of London).

Department of Physics and Astronomy **University College London, Bloomsbury**
Academic Mentor (*a.owusu@ucl.ac.uk*) *Sept 2018 – Dec 2018*

- I provided support and guidance to a group of first year students, by meeting weekly and preparing sessions to aid in their adaptation to university life and the physics course.

University of London Halls **Nutford House, Marylebone**
JCR Committee (*paul.phibbs@london.ac.uk*) *Sept 2017 – June 2018*

- Given responsibility as part of a team of four to organise events for fellow members in halls using a budget of £6,000.
  - Events ranged from small events such as Tea & Cakes, to large events such a Boat Ball.