Stephen Charles

Overview

Portfolio
DataCamp
GitHub

Proficient *pythonista* with a background in mathematics and computer science. Particular expertise in managing software pipelines and large data sets involving time series analysis and machine learning algorithms, in addition to interpersonal skills from a range of hospitality roles.

Employment

2022 – Now **Innovative Technologies** – *Manchester*
Position ***Machine Learning Engineer, Placement***
Stack *Python, Pytorch, Keras, Tensorflow, Numpy, Pandas, Sklearn, Git, Bash*
Duties
- ICU performs accurate age verification to automate the policy and allow access to age restricted purchases and premises, through an ensemble of convolutional neural networks.
- With AI algorithms developed over many years, ICU offers an accurate (99.88%) precise and affordable facial recognition system.

2019 – 2020 **Facebook (Meta)** – *London - Remote*
Position ***Data Scientist, Analytics Intern***
Stack *Tableau, SQL, Python*
Duties
- Performed large-scale data analysis to extract useful business insights.
- Identified the ones which were actionable, suggesting recommendations, and influenced the direction of the business by communicating the results to cross-functional groups.
- Classified leads so that the team could work on the most valuable cases, and suggested improvements in the tools and techniques to help scale the team.

Education

2021 – 2022 **Data Science**, *University of Bath*
MSc Master of Computer Science
Stack *Python, SQL, Pytorch, Keras, Tensorflow, Numpy, Pandas, Sklearn, Matplotlib, Seaborn*
Modules
Statistics for Data Science - Probability and statistics, with a focus on translating real-world problems into a mathematical framework in data science contexts.
Machine Learning - Covered both supervised and unsupervised machine learning algorithms from Bishop, including how to develop, evaluate and deploy trained models. The second semester involved advanced techniques focused on neural networks with both regression and classification.
Reinforcement Learning - Implemented various agents to solve environments from Sutton & Barto, including Dynamic Programming and Temporal Difference methods.
Bayesian Machine Learning - Employing approaches such as inference and monte carlo.

2020 – 2021 **Astronomy and Astrophysics**, *University of Manchester*
MSc *Distinction*, Master of Physics
Stack *Python, Numpy, Pandas, Sklearn, Matplotlib, Seaborn, Git, Bash*
Research Published a program to facilitate the data acquisition and analysis pipeline for TESS automatically, dubbed `firefly` (the best Sci-fi show!), which applies nested sampling (`dynesty`) to find best fit variables (`TransitFit`) between the host star and exoplanet.

2016 – 2020 **Mathematics with Computer Science**, *University of Nottingham*
MMath *Upper Second-Class Honours*, Master of Mathematics
Stack *C++, Python, R, Numpy, Pandas, Matplotlib, Seaborn*
Research Dissertation involved working with python to numerically solve spherical cavitation bubble collapse.

2014 – 2016 **Space Engineering**, *Loughborough College*
A-Levels *Mathematics* A* · *Further Mathematics* A · *Physics* A · *Engineering* A
A specialised course focused on Engineering with guest lectures at the Space Centre in Leicester.

General Tech Stack

Language Python, C++, LaTeX, SQL
Packages Numpy, Pandas, SciPy, AstroPy
ML Packages Sklearn, Tensorflow, PyTorch
Web HTML, Markdown, CSS
Scientific Matlab, R, Fortran, Mathematica
Software Microsoft Office, Tableau, Blender

Awards and Qualifications

2022 DataCamp: Data Science Track
2021 Kaggle Expert
2020 Tableau Desktop Specialist
2016 Full UK Driving Licence
2015 Grade 8 Violin

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Publications

Author -

Co-Author Hayes, J J C, E Kerins, J S Morgan et al. (2021) "`TransitFit`: an exoplanet transit fitting package for multi-telescope datasets and its application to WASP-127 b, WASP-91 b, and WASP-126 b", 1–14.

Academic Work Experience

Autumn 2018 **Scholarship**, *National University of Singapore*

Scholarship Obtained a scholarship to study a crash course in Korean language for 5 weeks and to learn about the culture and history of the changing landscapes of Singapore. Upon completion, applied to spend the Autumn semester here successfully.

July 2017 **Physics Outreach**, *The University of Nottingham*

Outreach I began, on a voluntary basis, promoting physics via social media which eventually evolved into a paid role in which I mediated with events staff in the department to ensure successful participation. Part of the role was ensuring inclusivity, and how best to target minority groups.

July 2014 **Research Intern**, *Space Research Centre, The University of Leicester*

Intern During my first college year I gained work experience at the University of Leicester Space Research Centre, assisting in the development of an astrobiology rock-sampling tool called SPLIT for use on Mars.

Positions and Responsibilities

2018 - 2019 **Mature Student Mentor**, *UoN*
I was a point of contact for mature students, helping them settle, and be there in a support capacity.

2017 - 2018 **Ambassador**, *UoN*
I presented, and gave advice to prospective students.

Public Speaking

2017 **Department of Physics**, *The University of Nottingham*
Gave introductions to guest speakers and shout outs in lectures to ensure everyone was informed of important events.

2014 **Space Research Centre**, *The University of Leicester*
Presented my findings to a crowd of 50 post doc students and an astronaut! My presentation was based on exoplanet research and the feasibility of alien civilizations to be space faring.

Volunteering

2017 **Magical Maths** – *Nottingham*

Role Organisation of weekly sessions to promote mathematics to primary school children, in line with the national curriculum.

Interests

Photography Avid adventurer and keen astronomer. This hobby pushes the boundaries of my interest in both.

Hiking Surviving extreme conditions makes me feel alive.

Music Self taught Guitar, Piano, Violin.

General Science fiction and anything spacey.

References

Name	Dr. Eamonn Kerins	Prof. Chris Harris	Dr. John Holt
Title	*Senior Lecturer*	*Research Professor*	*Research Engineer*
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	Department of Physics	Fellow	Department of Physics

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Statement of Interest

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Reference: **Machine Learning Engineer**
Date: Tuesday 22nd March, 2022

Dear Natural History Museum,

Before I started academic study I used to run a server for Ultima Online, primarily written in C++. As such, the server was highly customisable, and with the source code from another server I painfully merged two incompatible SVN's together to create one. Just by comparison alone I was able to get used to the logic and constructs that formed the language. Browsing through the many lines of code and merging was a very slow process, but it allowed me understand slightly different methods of doing things. It was almost like learning through reverse engineering. I like to follow the concept of learning by doing. Of note, I took interest in the AI constructs and pathing algorithms adopted, to try and create realistic npcs to fill the world.

My undergraduate studies primarily focused on Mathematics in its purest form, to which I supplemented this by taking extra modules from physics to practice its application. In my final year I took a formal C++ course to take what I had learned from my game server days and apply it to my reading during undergraduate study. Suddenly very nasty equations were efficiently solved! I think data analysis in this aspect fascinates me. My dissertation project involved the inter-facial perturbations of a spherical bubble, to which an approximate formula was derived. As with most fluid dynamics problems, the solution required numerical analysis. I was able to apply my previous knowledge and reverse engineering, adapting to new problems, using the many libraries and pseudo code available in literature.

Astrophysics became my next programming achievement. Extreme care, and background knowledge was required in the handling and use of very large data sets. The precise information needed extracting and filtering, by which a human doing such by hand would be very laborious! Specifically, I worked in exoplanet research, fitting light curves to improve on the planets already proven to exist. The hope is that with a greater sensitivity, more interesting and varied data will provide confirmation of exomoons and through transit timing variations, more planets! In this field I have written a self-contained python EDA pipeline (`firefly`) for a transit fitting program (`TransitFit`) to automate the data collection it requires to run. This was written in python, which has quickly become my favourite language. It can currently fit TESS lightcurves with a nested sampling routine, using a Bayesian machine learning approach. In the future I hope to expand the functionality by allowing simultaneous fitting of multiple space based and ground based telescopes.

I'm keen to apply to the position of Machine Learning Engineer at Natural History Museum because I feel that my past experience would be an asset to your team. My technical background paired with your current expertise would be of great benefit to us both, and I feel that at Natural History Museum I would meet like minded individuals who share the same passions for Data Science.

I am hopeful these considerations will be of benefit in the application process. Should you require more depth than supplied here, please visit my `GitHub` and `Portfolio`.

Kind Regards,

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