Josh Southern

An Applied Mathematician with some experience in Machine Learning applied to health technologies. I have strong skills in modelling time-series and complex systems. A portfolio of some of my work is available at jks17.github.io

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Education

Msc Applied Mathematics, Imperial College London | Distinction | 2017 - 2018
Courses include: Ergodic Theory, SDEs, Bifurcation Theory, Dynamics of Games, Complex Systems and Computational Stochastic Processes.
Thesis: Information-theoretic analysis of EEG from a musical performance

Bsc Physics, University of Bath | First Class | 2014 - 2017
Thesis: An investigation of Bound States in the Absence of a Confining Potential

Reed's School | 2007-2014
A Level
A* in Mathematics, Physics and Chemistry. A in Further Mathematics.
AS Level
A in Mathematics, Further Mathematics, Chemistry, Physics and English

Extra-Curricular

Tennis: Travelled Europe as a junior playing events and captained the school tennis team to seven national titles as well as runners up at the World Schools Championships. I continue to play at county level.

Volunteering: Went to South Africa as part of the Calabash Charity and taught in the local schools whilst building a netball court and a library.

Work Experience

Since Sep'18 Machine Learning Researcher — Limbic, London

The first hire at an AI startup using machine learning to improve the Mental Health space.

- Individually responsible for building the deep learning model which outputs an emotional state prediction from PPG data collected from a smartwatch.
- Integrated the model as part of the Limbic app to notify users at relevant times. This involved building back-end services using Postgres as well as using AWS, Docker and Flask for deployment
- Built data visualisation dashboards for monitoring app metrics using Dash
- Built NLU into the App's Chatbot to recognise mood, gibberish and activity and appropriately respond using tools such as NLTK, spaCy, BERT and Snorkel.

Apr-Aug'19 Resident — Google for Startups, London

Part of a team that was selected as one of five start-ups in the UK for Google's Residency program 2019. Was mentored by a team of senior Googlers on multiple topics ranging from software development best practices to creating a good workplace culture.

Jun-Jul'16 Data Collector/Statistician — IBM, Wimbledon

Interpreted point construction and analysed statistics at the All England Championships. Aided the technology on IBM Slamtracker which allows you to see the key statistics which are driving the outcome of the match. I continued this work by helping a research team at Imperial with trying to automate the process of data collecting in tennis.

Publications

Jan'19 R. Harper and J. Southern (2019). A Bayesian Deep Learning Framework for End-To-End Prediction of Emotion from Heartbeat. arXiv.
Currently in review for the journal IEEE Transactions On Affective Computing

Feb'19 R. Harper and J. Southern (2019). End-To-End Prediction of Emotion From Heartbeat Data Collected by a Consumer Fitness Tracker. arXiv.
Peer-reviewed and presented at ACII 2019 conference.

Oct'18 H. Rajpal, J. Southern, P. Mediano F. Rosas and H. Jensen (2018). Quantifying togetherness in a musical concert via effective EEG networks.
Peer-reviewed and presented at NetSci 2019 conference.

Skills

- Experienced Programming in Python for real-time applications.
- Some experience Programming in C/C++, MATLAB and R.
- Application of machine learning using tools such as SciKit, Keras, OpenCV and TensorFlow, primarily in the context of time-series analysis.
- Knowledge of AWS (s3, lambda, Sagemaker) and some experience with Heroku and Flask.
- Knowledge of containerisation using Docker.
- Experience building data visualisation web applications using dash-python.
- Experience with Database management using SQL and Postgres.

References

references available upon request