Danny James Williams

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Statement

I am currently a second year PhD student, studying computational statistics and data science at the University of Bristol, UK. I have pursued academic work and personal projects with a focus on learning state-of-the-art machine learning algorithms. I am enthusiastic about using my statistical knowledge to enhance artificial intelligence in domains such as the climate and health sciences, where I can be of most value. Outside of work, I enjoy weightlifting, tennis and intense one-versus-one sports and games; I value working hard towards a goal and seeing improvement in myself.

Education

COMPASS CDT
University of Bristol
Began September 2019

MMath Mathematics
University of Exeter
Graduated with a first in 2019

A Levels
Ivybridge Community College
A* - Maths
A - Further Maths AS
B - Physics
B - English literature

Study

Undergraduate
• Generalised Linear Models
• Spatial Statistics
• Time Series Analysis
• Statistical Inference
• Numerical Optimisation
• Machine Learning
• Extreme Value Theory
• Mathematical Proofs
• Analysis

Postgraduate
• Statistical Methods
• Statistical Computing
• Convex Optimisation
• Statistical Proofs
• Deep Learning
• Bayesian Modelling
• Machine Learning

Research

Probability Density Estimation on a Truncated Manifold
University of Bristol | 'Mini' Project (2020)

Developed theory and methodology for estimation of probability density models in a Euclidean and manifold setting. This work was extended to the case where observed data are artificially truncated, and applied to real-world datasets with promising results.
Skills learned: theory • proofs • MATLAB • R • differential geometry • machine learning • constrained optimisation

Downscaling Extremes of Precipitation
University of Exeter | Masters Project (2019)

Modelled the relationship between extremes of rainfall and their spatial properties for both gridded model output and point-level observations using extreme value theory. Used this information to predict rainfall extremes at a high resolution with a spatial generalised additive model (GAM).
Skills learned: R • GAMs • extreme value theory • report writing • presenting • packaging code

Post-Processing Ordinal Weather Forecasts
University of Exeter & Met Office | Summer Placement (2018)

Investigated temporal patterns in the forecasting of total cloud cover. Developed methodology to detect an underlying signal hidden between observations and forecasts, improving prediction accuracy from previous methods employed by the Met Office.
Skills learned: Bayesian modelling • R • JAGS • MCMC • data analysis • presenting

Calculating Ocean Heat Content
Reading University | Summer Placement (2017)

Mapped out and plotted temperature changes over the last decade. Used deviations from long-term climate averages to make incomplete data more reliable. Reported on the effect of more sparsely spread data.
Skills learned: Python • data analysis • data engineering • computational efficiency • teamwork

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Achievements

Online Courses

• Machine Learning with Tensorflow on Google Cloud Platform
• Build a Deep Learning Based Image Classifier with R
• Neural Networks and Deep Learning
• Academic Literacy

Awards

• The Exeter (Employability) Award
• Level 1 Tennis Coach

Skills

Programming
Python • R • C++ • Rcpp • MATLAB • SQL

Professional
Report Writing • Group Project Work • Presenting • Teaching • Critical Thinking • Time Management

Personal

I rather enjoy video games, especially competitive games which I can practice and compete against my friends in.

Weightlifting is one of my biggest passions outside of work; I feel very satisfied being able to lift heavy weights.

I'm really environmentally concious and strive to live as sustainably as I can.

Classical music and movie soundtracks are my favourite type of music, but in a stark contrast, my second favourite genre is rap and hip-hop.

Supplementary Projects

Water Pipe Leakage Detection
Worked with Wessex Water and within my PhD cohort to identify potential leaks in water pipes. The final method involved unsupervised learning of time series clusters, fitting a seasonal additive model to output residuals, and then implementing a changepoint detection algorithm on these residuals.

Natural Language Analysis
Independently analysed the sentiment and syntax of the lyrics of famous artist Kanye West using Google's Natural Language API. I created interactive visualisations of the results for an online blog post on my personal website, and for an open-source repository on Github.

Gaussian Process Classification
Part of a group project during my PhD, involved learning, detailing and exploring the process of classification using Gaussian processes with an MCMC sampler. Implemented a pseudo-marginal likelihood approach, with intelligent subset selection for large datasets and a Laplace approximation for the posterior of the latent variables. All code was written into an Rcpp package.

Chicago Crime Classification
Classified whether an arrest would be made for a particular crime, using a public crime dataset for Chicago. Implemented a logistic regression approach with iteratively re-weighted least squares from scratch, whilst taking advantage of the sparsity of the model matrix to improve efficiency.

Employment

Customer Service Assistant | Libraries Unlimited (2018 - 2019)
• Social Media Management
• IT Systems
• Customer Facing Role
• Warehouse Work

Delivery Rider | Deliveroo (2017 - 2018)
• Personal Schedule
• Physical Fitness
• Strict Deadline
• Time Keeping

Customer Consultant | Dixons Carphone (2016 - 2017)
• Sales Role
• Constant Communication
• Working to Targets
• Simplifying Complex Technology

Customer Assistant | Tesco (2014 - 2015)
• Long Working Hours
• Worked Under Management
• Interpersonal Skills
• High Pressure Environment

References

Available upon request.