James Edwards

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Employment

2017-2019: Senior Research Associate, Lancaster University.

Academic Qualifications

2012-2016: Ph.D. in Statistics and Operational Research. Lancaster University.

2011-2012: M.Res. in Statistics and Operational Research, with Distinction. Lancaster University.

2010-2011: M.Sc. in Operational Research and Management Science, with Distinction. Lancaster University.

2000-2008: B.Sc. Hons Open, 1st class. The Open University (studied part time due to illness).

Research

My research is concerned with Bayesian sequential decision problems, a primary example of which is the multi-armed bandit problem. These problems are concerned with choosing actions over time where there is some information that is important to each decision that is known only with uncertainty. By observing the results of our actions we can learn more about these uncertainties and therefore make better decisions in the future. A classic difficulty of these problems is how to trade-off exploitation of current knowledge against exploring to gain information.

I have contributed to this area by investigating and developing computationally efficient heuristic methods which are important for the realistic models required for applications. This included work showing robustness advantages of an index heuristic over a similar non-index method even though the latter incorporates more information. As part of this work I developed and made available code, written in R, to enable researchers and practitioners to calculate Gittins indices in common problem settings.

In research supported by Google, I have worked on the problem of selecting multiple website elements (e.g. adverts or news stories) and the problem of redundancy between similar elements. I developed new models for user actions which incorporated correlation between elements, a Bayesian model for feedback and learning, and fast algorithms to select elements to maximise user clicks over time.

Publications

Edwards, J. and Leslie, D. (2018) Selecting Multiple Web Adverts - a Contextual Multi-armed Bandit with State Uncertaintly. *Journal of the Operational Research Society*, in press.

Edwards, J. and Leslie, D. (2018) Diversity as a Response to User Preference Uncertainty. *Statistical Data Science.*

Edwards, J., Fearnhead, P. and Glazebrook, K. (2017) On the Identification and Mitigation of Weaknesses in the Knowledge Gradient Policy for Multi-Armed Bandits. *Probability in the Engineering and Informational Sciences.*

Edwards, J. (2016) Exploration and exploitation in Bayes sequential decision problems. *PhD thesis,* Lancaster University. http://eprints.lancs.ac.uk/84589/

Experience

- Graduate teaching assistant at Lancaster University for both the Management Science and the Mathematics and Statistics departments. Subjects include: Probability, R, Latex, Business Analytics, Bayesian Statistics, Programming for Data Science and Statistical Inference.

- Running the R part of the Project Skills undergraduate course. This involved editing notes, writing and administrating a test, collating marks and handling student queries and issues.
- Member of the committee which organised the Understanding Complex Large Industrial Data (UCLID) conference. This was student led at every stage including funding application.

Extra Training and Skills

The STOR-i Centre for Doctoral Training gave opportunities for extensive training beyond that required for the PhD. Examples include:

- I supervised an 8 week intern research project designed by myself.
- Industry problem solving days. Work in groups on a problem presented by a company or other non-academic organisation. Example companies include Shell, BT and DSTL.
- Extended training in statistics and operational research topics at NATCOR and APTS courses and STOR-i organised masterclasses given by international experts in their research area.
- Training in vocal and written communication from Vox coaching, Michael Blastland and Andrew Garratt.
- Giving regular research talks at a weekly forum.
- Active participation in student led groups such as a research computing group and a machine learning reading group.

Personal Interests

I enjoy running (especially fell and trail), cycling and cooking.

References available on request.