Rory Telford Ph.D. MSc BEng (Hons) MIET

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PROFILE

Rory Telford is an experienced Associate Researcher in the Department of Electronic and Electrical Engineering at the University of Strathclyde. Within this position, Rory has been involved in a variety of research projects in collaboration with both industrial partners and the Scottish Government. Rory has also completed an industrially focussed Ph.D. working with Airbus Group in the aerospace sector. Rory has particular expertise in the fields of power system analysis and design, data analytics, machine learning and computer programming. Experiences in these posts have provided a number of valuable skills, including: working individually; planning and structuring projects; and operating as part of various teams. Rory has gained experience in technical communication through supervising undergraduate student projects and teaching in laboratories and tutorials. Excellent report writing skills have been developed, along with communication and problem solving skills.

CORE SKILLS & KNOWLEDGE

- Computer programming and software development. Rory has experience developing Python applications using associated machine learning and statistical packages (pandas, numpy, scipy). Rory also has experience in developing web based applications, including: back-end development with the Django web framework; front-end coding with Javascript, HTML and CSS; and, management of relational databases. Rory has significant experience working with, and developing software using, geographic information system (GIS) data.

- The ability to process, analyse and extract features from large datasets, including the development and use of relational databases. Rory has a strong background in probabilistic modelling and also has experience in utilising and applying both deterministic and probabilistic forecasting techniques. Rory also has expertise in signal processing/data transforms and formal selection of discriminative features within datasets.

- Development of machine learning based systems for a range of problems, including the diagnosis of network faults/plant anomalies/erroneous conditions and forecasting future system demand. Rory's development experiences have extended to both supervised and unsupervised learning based systems. Rory's Ph.D. focussed on the development of machine learning based methods for detection and diagnosis of particular electrical network fault conditions within aircraft sub-systems.

- In-depth knowledge of power system design and operation. Rory has particular knowledge of the medium voltage and low voltage network architectures and design principles across the UK, as well as stand-alone systems including aircraft and shipboard electrical power systems.

WORK EXPERIENCE

University of Strathclyde Glasgow, Scotland
Research Associate, Electronic & Electrical Engineering April, 2017 − Present
Research Assistant, Electronic & Electrical Engineering March, 2015 − April 2017

These posts have involved leading and assisting various projects including:

- Rory is currently working as part of a project that is developing machine learning models to improve future management and operation of electricity networks, including where, and when, investment will be required. The project has multiple industrial and academic partners, and Rory is lead researcher on one of the Work Packages. Most recently, Rory has developed a Python based application that translates raw GIS electricity network data into a network model. This particular work was undertaken with Scottish and Southern Energy (SSEN), and allows them to run different scenarios across their networks. The application strongly depends upon the GeoPandas library and has been developed such that any raw GIS shapefiles across SSENs network can be autonomously translated.

- This current project has also used customer Smart Meter Data to inform network operation. In particular, Rory developed a clustering algorithm based on Gaussian Mixture Models to define and classify groups of customers with Smart Meters that exhibit similar energy use characteristics.

- Investigating, as part of a Scottish Government funded project, how the move to low carbon energy will change supply and demand characteristics and impact Scotland's electricity system. This included working with extensive datasets, and an interactive web app was developed using Django and deployed on nginx. The app was developed fully in line with the Scottish Government's specifications to allow stakeholders to understand the impact of low carbon technology at different local levels across Scotland.

- Processing and analysis of extensive network demand data for Scottish Power Energy Networks (SPEN). Raw data was captured at high resolution over an 18 month period across SPENs Fife network. This data was cleaned and processed into a relational SQL database. Various data driven analytics were developed for forecasting and characterising electrical demand at street/neighbourhood level, and for determining long-term demand profiles.

These posts have given Rory significant experience in: handling, processing and analysing large datasets; understanding, developing and applying techniques to system data; software development; report and technical paper writing; collaborating with industrial and university partners; supervision of undergraduate and postgraduate student projects; and, peer reviewing technical papers. Various publications and technical reports have resulted from these projects; please refer to the following for further details: `https://pureportal.strath.ac.uk/en/persons/rory-telford/publications/`

Elimpus   Glasgow, Scotland
Consultant   August, 2013 − February, 2014

Assisting a Condition Monitoring Service Company establish correlations between partial discharge activity in electrical substations and weather conditions. This included processing and analysis of large data sets and application of statistical methods. In particular, principal component analysis was applied to weather data to understand relations between different ambient variables and increased occurrences of partial discharges.

EDUCATION & TRAINING

Ph.D. in Electronic & Electrical Engineering   June, 2017
University of Strathclyde & Airbus Group   Glasgow, Scotland

The Ph.D. focussed on researching and developing new, reliable, methods for diagnosing and isolating faults within aircraft sub-systems and low voltage microgrids. Methods developed throughout the Ph.D. were based on data driven, machine learning based, techniques. The Ph.D. has resulted in Rory gaining significant experience in: developing machine learning models; processing and analysing data; extracting and selecting features from data; signal processing; algorithm development; and, implementing and testing algorithms on testbeds.

MSc in Electronic & Electrical Engineering   November, 2011
University of Strathclyde   Glasgow, Scotland

BEng (Hons) in Electronic & Electrical Engineering   July, 2008
University of Strathclyde   Glasgow, Scotland

SUPERVISION & TEACHING DUTIES

Co-supervising undergraduate students throughout various final year projects offered the opportunity to provide technical guidance and support students in both defining and reaching project objectives. Rory has also assisted in various undergraduate laboratory programmes for the past five years.