Mark Worrall

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SUMMARY

I have been on a career break since summer 2018 in order to self-study areas of machine learning more thoroughly and change career direction. My aim is to work in a technical machine learning role for a startup which has an ambition to change the world for the better.

I have a strong mathematical background and have expertise in a wide range of classical machine learning models including deep learning where I have competed in kaggle competitions and am currently ranked in the top 1% globally. More recently I have taken an interest in machine learning from a probabilistic perspective, with a current area of interest being generative modelling using VAEs.

SKILLS

- **Mathematics**: strong grounding in many areas including probability and statistics, linear algebra and calculus.
- **Machine learning:** experience developing and training a broad range of machine learning statistical models.
- **Deep learning**: developed models for image and NLP tasks as well as structured data.
- **Coding**: fluent Python programmer with additional expertise in R and MATLAB.
- **Model building:** confident self-learner able to iterate quickly from novice in an area to building robust and high-performing models.

PROJECTS

I have competed in several online machine learning competitions on kaggle, highlights include:

Semantic segmentation *silver medal: position 76/3234*

Seismic imaging data where I developed models using techniques such as deep supervision with custom architectures and multiple loss functions to predict salt deposits under the earth.
Language used: Python. Deep learning framework used: PyTorch.

Image classification *bronze medal: position 138/2172*

Rare protein detection with high resolution medical images and extreme class imbalance required custom architectures to scale with image quality.
Language used: Python. Deep learning framework used: PyTorch.

Structured data (incl. NLP) *silver medal: position 20/1873*

Online ad demand prediction where I developed custom NNs to handle text and categorical data including training my own Russian word embeddings. Final solution was an ensemble of multiple models using boosting.
Language used: Python. Deep learning framework used: Keras.

House price forecasting *silver medal: position 21/3274*

Time series problem with poor data quality involved careful cross validation set-up to reduce model variance and be robust to outliers. Mix of models including linear models, SVMS, tree models, clustering and dimensionality techniques.
Language used: R.

WORK EXPERIENCE

Aberdeen Standard Investments *London, UK*

Investment Manager/Portfolio Engineer: Portfolio Construction/Quantitative Portfolio Modelling
May 2015 – Jun 2018

- Use of machine learning techniques in portfolio design: clustering, time-series modelling and regime change detection.

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- Portfolio optimisation to design new portfolios, monte-carlo simulation using stochastic economic models, statistical modelling for risk decomposition and analysis of alpha drivers.
- Built a tactical asset allocation solution to trade markets across many portfolios using MATLAB.

Investment Risk Manager: Market Risk
Sep 2011 – May 2015

- Statistical risk modelling using a PCA multi-factor model for multi asset class risk modelling.
- Quantitative analysis and market risk modelling using monte-carlo methods.
- Technical development to generate analytics and research around various risk metrics.
- Asset modelling with strong knowledge of a range of mathematical approaches utilised.

Aviva Investors *London, UK*

Graduate Analyst: Finance
Sep 2009 – Aug 2011

- Financial Modelling and strategic analysis whilst on graduate scheme.

Aviva PLC *York, UK*

Actuarial Analyst: Actuarial
Sep 2007 – Aug 2008 (placement year between 3rd and 4th year of university)

- Development of actuarial models to forecast future liabilities and cash flows of future investments.

EDUCATION

2004 – 2009 *University of York*

Master of Mathematics (MMath)
Classification: 1st class honours
Industry placement between 3rd and 4th academic year

Relevant MOOCs:

- Mar 18 (Coursera): Deep Learning Specialization (5 courses) by Andrew Ng - 100%
- Jul 17 (Coursera): Bayesian Statistics (MCMC) - 97%
- Sep 18 - present (edX): Artificial Intelligence MicroMasters with Columbia University
  - 4 graduate level courses in Machine Learning, AI, Robotics, Animation and CGI
  - Completed: Machine Learning (92%) and Robotics (95%)

OUTSIDE INTERESTS

- *Social mobility*: mentor at the Social Mobility Foundation since 2014 and speak at industry panel events on their behalf to help new mentors work effectively with young people.
- *Education*: school governor since 2017 and currently co-chair of governing body of an inner city primary school.

REFERENCES

Dr. Richard Arkell, Head of Market Risk, Aberdeen Standard Investments
Robert Franklin, Investment Manager, Aberdeen Standard Investments