

Mark Worrall

maw501@gmail.com / 07866 947235 / <https://maw501.github.io>

SUMMARY

Programmer and mathematician with 7+ years experience developing statistical models. Built and used machine learning methods in financial markets as well as for computer vision and NLP problems.

SKILLS

- **Mathematics:** strong knowledge of many areas including those core to data science: probability and statistics (including Bayesian methods), linear algebra and multivariate calculus.
 - **Machine learning:** built and used broad range of classical machine learning methods.
 - **Deep learning:** experience building models for image and NLP tasks as well as structured data using PyTorch.
 - **Data science:** proficient with the full project workflow from gathering and cleaning data to building models, visualization and experiment design.
 - **Programming:** experienced Python programmer with additional expertise in R and MATLAB. Deployed production models for trading financial markets.
 - **Personal:** strong leadership experience, love to be part of and help build high-performing teams, excellent communicator and public speaker.
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PROJECTS

Active participant in competitive machine learning competitions on kaggle, currently ranked top 1% globally, including:

NLP and structured data

silver medal (team of 3): position 20/1873

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

Time series modelling

silver medal (solo): position 21/3274

House price forecasting 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.

Computer vision: semantic segmentation

silver medal (solo): position 76/3234

Seismic imaging data where developing CNN 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.

Computer vision: classification

bronze medal (team of 3): 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.

CAREER EXPERIENCE

Career break

Jul 2018 - Present

- Exploring starting my own business using artificial intelligence within education.
- Chair of governors of a London primary school with a large deaf provision (volunteer position).

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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.
- 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.
- Asset modelling with strong knowledge of a range of mathematical approaches utilised.

Aviva Investors

London, UK

Graduate Analyst: Finance
Sep 2009 – Aug 2011

Aviva PLC

York, UK

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

EDUCATION

2004 – 2009
UK

University of York,

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

Relevant MOOCs:

- Mar 2018 (Coursera): Deep Learning Specialization (5 courses) by Andrew Ng - 100%
- Jul 2017 (Coursera): Bayesian Statistics (MCMC) - 97%
- Sep 2018 - present (edX): Artificial Intelligence MicroMasters with Columbia University
 - 4 graduate level courses: Machine Learning, AI, Robotics, Animation and CGI
 - Completed: Machine Learning (92%), Robotics (97%), AI (97%)

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 chair of the board of governors for an inner city primary school with a large deaf provision.

REFERENCES

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