ZELLA BAIG

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Education

University of Oxford, Mansfield College - MSc Mathematical Modelling & Scientific Computing *2023*

Dissertation: Singular Spectrum Analysis for Time Series, working with BlackRock.

Projects:

- Adaptive Optimisation Algorithms: Analysis of recent ML algorithms with an application in house pricing.
- Computational Call Pricing: Examining a neural-network based call pricing algorithm.
- Image Recolourisation: Python GUI program to recolourise images using RKHS methods for the backend.
- Battery Modelling: Construction of a model to analyse battery degradation for electric vehicles.

Courses: Continuous Optimisation, Numerical Linear Algebra, Machine Learning, Models of Financial Derivatives, Numerical Analysis, Python in Scientific Computing

University of Oxford, St. Hilda's College - BA Physics (2.i) *2019 - 2022*

Skills

Data Science

- Python and MATLAB based numerical modelling (e.g. via RK4)
- Data analysis utilising Pandas, SciPy, and Jupyter in both experimental and non-experimental contexts
- Neural networks for option pricing predictions
- Analysis and implementation of optimisation methods for numerical methods and ML algorithms e.g. AdaLoss
- Machine learning using the Scikit-learn, XGBoost, and custom-built libraries to e.g. predict trade settlements
- Denoising and spectrum analysis via PCA, SSA, and fourier modes for multivariate datasets
- Optimisation for constrained usecases in Python e.g. JIT via Numba, and NumExpr for memory

Computing & Development

- Python package creation including testing via Pytest, logging, and exception handling
- Java in the context of JUnit tests using Mockito built with Maven for FX trade spot and tenor behaviour
- Jira and Confluence for team organisation
- Cucumber testing to deliver features via a BDD framework
- AWS Cloud Development Kit
- Version control with Git, Bitbucket
- Unix based operating systems (Linux, OpenBSD, Plan 9)

Databases

- Worked with both graphical (neo4j) and traditional databases, using tools such as Cypher Query Language, Tableau, shellscript, awk, and sed

Experience

London Stock Exchange Group (Technology Intern with ForexClear, and RepoClear) *Jun 2022 - Aug 2022*

- Incorporated edge-case detection for trade rollovers on holidays
- Tested trade settlement behaviour within larger Java applications using both JUnit and Cucumber tests
- Utilised a BDD testing framework to incorporate these trade settlement tests
- Constructed a GUI using macros and VBA within Excel to automate data input to internal databases
- Aided the production of a machine learning model to predict trade failure utilising the XGBoost library
- Supported the initial migration to AWS CloudFormation, debugging and deploying the initial stacks
- Liased amongst departments and supported a pitch to initialise BDD testing amongst RepoClear development teams

Ditchley Foundation (Network Analysis Intern) *Jul 2021 - Aug 2021*

- Queried and analysed a neo4j graph database ($\sim$ 110K nodes) using Cypher Query Language alongside Python
- Drew out trends and within the database of people and presented them visually alongside my team
- Began topic modelling using on call notes within the database using the Gensim and NLTK libraries
- Conducted research into themes and roles of key figures for potential Ditchley Conferences

OxFizz (Widening Participation Intern) *Aug 2020*

- Created a month long research report on barriers for disadvantaged Oxbridge applicants with 2 other interns
- Conducted research through provider interviews and student questionnaires distributed to $\sim$ 500 students
- Investigated existing access provisioning and identified lacks therein, presenting these gaps graphically
- Provided recomendations for future access support programmes, bearing in mind resource constraints
- Outlined and began development of a long-term student roadmap resource for Oxbridge applications