RAJAT RASAL

Mob No: +44 (0)774-705-4634
Email: rrr2417@ic.ac.uk
Github: https://github.com/RajatRasal
Blog: https://rajatrasal.github.io

EDUCATION

Imperial College London
MEng Computing (Sept 2017 - July 2021)
Achieved **1st Class** in 2nd year

Ilford County High School
Secondary School (Sept 2010 - July 2017)

- A level - 3 A*, 2 A : Mathematics, Physics and Computing, EPQ (research project) and Further Mathematics.
- GCSE - 12 A*, 1 A, 1 A* with Distinction in Further Mathematics

WORK EXPERIENCE

ALLOT LIMITED
Freelance Consultant (Sept-Oct 2019)

- Created a single page React JS webapp to aid pharmaceutical salespeople with launching better targeted marketing campaigns.
- Deployed a Flask REST API over AWS Elastic Beanstalk which used SqlAlchemy ORM to connect to an AWS RDS Postgres instance.

HSBC
Data Science and Engineering Intern (July-Sept 2019)

- Gained experience with the **Hadoop ecosystem by working on a 10 PTB cluster.** I did 2 projects:
    1. Large table joins using **SparkSQL** across multiple unstructured data sources in order to detect unnecessary funds being held in reserve. My algorithm ran within 30 minutes and identified $4 Billion worth of discrepancies.
    2. Built a machine learning model to generate a prioritised list of factors contributing to missing or inconsistent data in the data lake. This was fed back to data quality teams around the world.
- Used Elasticsearch, through Bash and Python, to speed up large remote table joins (using semi-join technique).
- Migrated internal cluster analytics platform to using **Elasticsearch** backend.
- Introduced good Python software engineering practices to the team: Pytest, PyLint, effective Jupyter notebook usage, standard library.

Devito Project Research Group @ Imperial College London
Software Research Intern (July-Sept 2018)

- Implemented a machine learning model using **TensorFlow** to solve an inversion problem where gradient calculations were performed by the Devito engine.
- Performance tuning using grid search and **Bayesian optimisation techniques** for hyperparameter optimisation
- Used Dask to distribute gradient calculations using Docker containers over a Kubernetes cluster hosted on Google Kubernetes engine on **Google Cloud Platform**.
- My work has contributed to various conference presentations and academic papers.

PythonAnywhere
Intern (Aug 2016)

- Redesigning the layout for the quickstart guide using JS and Bootstrap
- Churn analysis for paying users
- Used **agile development methodologies**: pair programming, extreme programming, TDD, CI/CD, IID.

Bank Of Tokyo Mitsubishi
Intern (Aug 2015)

- Improved their internal web portal design using HTML, CSS and Javascript.

TECHNICAL SKILLS

	Proficient in	Comfortable with	Exposed to
Languages and Technologies	**Python 3+** (5 years): Numpy, Sklearn, Pandas, Flask, Pyspark, Pytest + mock (TDD), Flask, Django, SqlAlchemy, PyLint + PEP8, Standard Lib; **Java 8-10;** HTML5 + CSS;	C; Bash; SQL; **Machine Learning**: **Tensorflow, PyTorch, Scikit-Learn, Keras,** Spark Mllib, ONNX; C++11-14; Elasticsearch; **Hadoop Ecosystem:** Spark, Hive, Yarn, Pig, HDFS; Docker; Javascript; JQuery; Haskell; **TDD**: JUnit4+, pytest; Concurrency in Java; MongoDB; Android SDK; **Elixir;**	Google ARCore; NodeJS; Kubernetes; Dask; **Google Cloud Platform Tools** (Kubernetes Engine, App Engine, Storage, Cloud functions); **Google Analytics;** Scratch; Prolog; **ReactJS**; Scala; **AWS** (Elastic Beanstalk, RDS); **Computer Vision Techniques** (RCNN, Hough Transform, SIFT, ORB, etc.).
Software and Tools	Jupyter Notebooks; VIM; Slack; Github; GitLab; Gitlab Runner. Markdown;	Intellij IDE; Latex; Android Studio and Material Design; Github Pages; Gitlab Runner; Travis CI;	ServiceNow; Gradle; Ansible;

NOTABLE PROJECTS

Neural Network Intepretability   Oct-Dec 2019
- **Deep neural network visualisations dashboard** to display explanations for the results of black box models
- Techniques: saliency and occlusion mapping, feature maps, autogenerated text descriptions and word embedding to provide novel data driven interpretations also.
- Frontend - ReactJS; Backend - Python (ONNX, Tensorflow, Keras), MongoDB; Deployed using GCP.

NotespaceAR   May-June 2019
- An innovative mobile app for students who are visual-spacial learners. Students can post interactive virtual post-it notes through their camera using **augmented reality technology,** which they can later view for interactive revision on their own or with friends.
- **Used Google AR Core for AR components** 🔭 ; Frontend - written in Java with Material Design; Backend - Flask server (Python), MongoDB for data warehousing; Deployed using GCP

WACC Compiler   Jan-Apr 2019
- Used Java and ANTLR tool to create a compiler for the WACC programming language.
- Added a number of optimisations, such as constant propagation and array bounds checking, and an Intellij IDE plugin for the language.

PintOS   Sept-Dec 2018
- Optimised/developed key features of a simple OS framework for the 80x86 architecture in a small team using C.
- Features include MLFQS scheduling, system calls for user programs and virtual memory.

Other Projects
- Feb 2020 - Implementation of **RAFT distributed consensus** algorithm using Elixir to simulate a simple distributed database.
- Mar-Apr 2019 - **Facebook Hack-a-project**, designed a webapp using React to help connect local care-homes and volunteers.
- Apr 2018 - Led 1st year group research project on **cloud computing with Tensorflow**, Spark and MapReduce; **we won the 2nd place prize overall**
- Dec 2018 - **Forecasting stock prices based on Sentiment Analysis (NLP)** 📈 of Trump's Tweets in King College London Annual Hackathon using Word Embeddings and Deep Stacked RNNs. **Won runner up in Capital One Financial Challenge.**
- Oct 2018 - Performed a detailed data analysis and made predictions on the UK Road Accident's dataset for **Imperial AI Hack 2018.**
- May-Jun 2018 - Used conductive paint to create a handsfree music control interface for a Raspberry Pi
- Aug 2018 - **Multivariate RNNs and Statistical Models to do time series forecasting of Bitcoin prices.**
- 2016 - Web based cricket scorecard using Django, JQuery and a Node.js server to post real-time score updates to Twitter.

ACTIVITIES AND INTERESTS

Extra-Curricular Interests
- 2019 - present **- Imperial Advance Data Science Team;** entering competitions to do ML and data science challenges
- 2019 - present - Treasurer for Imperial Cricket Club; aside from handling finances I'm making an app to help committee members manage internal processes and updating the club website also.
- 2018 - present - **Data Science & ML - various Kaggle Competitions**, attended Cambridge Spark Data Science courses at JP Morgan and HSBC
- Sept-Nov 2017 - Department of Computing Society education scheme - teaching weekly coding lectures to non-computing students.
- 2015 - Taught programming at local primary schools - ran after-school computer science course at a local primary schools, teaching year 5/6 students programming techniques in Python and Scratch. Won the Jack Petchey Award.

Awards
- Dec 2018 - **2nd place Capital One Financial programming challenge** in Kings College London Annual Hackathon
- Apr 2018 - **2nd place Imperial College corporate partnership programming prize** for projects in topics in Computing
- Apr 2018 - **2nd place Imperial College partnership programming prize** for presentations in topics in Computing

Hobbies

🏏 Played semi professional county cricket for Essex and the Essex academy; 🎻Played the violin - ABRSM Grade 5.

REFERENCES

Dr Paul Kelly - p.kelly@imperial.ac.uk (reference below); **Dr Gerard Gorman** - g.gorman@imperial.ac.uk (available on request);