Hifzur Rahman
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EDUCATION

University Of Cambridge, Cambridge, United Kingdom — Enrolled: October 2023 — Expected: June 2026
BA Computer Science

A Levels — October 2021 — June 2023
3A*, Mathematics, Further Mathematics, Physics
Distinction in AEA Mathematics

SKILLS

- OOP, Algorithm Design and Analysis, Software and Security Engineering, Databases (SQL, NoSQL), UNIX
- Python, JavaScript, Node.js, Express.js, AWS, FireBase, Pandas, Numpy, TensorFlow

EXPERIENCE

University College London — London, United Kingdom
Research Assistant — November 2021 - May 2022

- Plotted and analysed over 500,000 synthetic data points to investigate high harmonic generation. This project used **Python**, **Matplotlib** and **Numpy** and contributed towards a Doctoral Thesis (Chapter 8)
- Presented findings at two conferences, to around 50 academics at UCL, and an audience of more than 100.

Samsung Solve for Tomorrow (Competition) — London, United Kingdom
Team Lead — May 2022

- Directed a team of 4 to the semi-final of the SFT competition, with a prize pool of **£10,000**, where we designed an app to help students maximise their studying efficiency by suggesting topics to study based on percieved difficulty.
- Designed a rudimentary algorithm, which used a Markov model to transition between difficulty levels.
- Programmed a prototype of the app using **React Native** and **JavaScript** for the front-end and **Node.js** and **Express** for the back-end. Also utilised **FireBase** to store user data and for authentication.

University College London — London, United Kingdom
Research Intern — July 2022

- Shadowed machine learning researchers at UCL, applying the SuStaIn algorithm to predict the progression of neurodegenerative diseases - in particular, Alzheimer's disease.
- Used **Python**, **Matplotlib**, **Pandas**, **Numpy** and **SciKit Learn** to clean and analyse over 10,000 biomarker data points, fitting a Gaussian Mixture Model to identify possible categories.
- Learnt some of the mathematics underlying Stage Inference, such as the Expectation Maximisation algorithm, used to estimate the parameters of the Gaussian Mixture Model.

PROJECTS

Economics Tutor Bot — June 2022

- Created a chatbot which could answer questions on basic economics.
- Experimented using the **OpenAI API**, and the **Langchain** framework to generate answers.
- Used **Chart.js** to plot economic data and trends, such as historic GDP growth, inflation rates and unemployment rates.

Focus Sounds App (work in progress) — June 2024

- Developed an app allowing users to play sounds that help them focus (rain, thunder, train sounds etc.).
- Used **React** and **JavaScript** for the front-end and **Node.js**, **Express** for the back-end.
- For the back-end, used **DynamoDB** to store user playlist data, **AWS S3 Buckets** to store sounds and **AWS Amplify** for authentication.

Black Scholes stock pricer and Implied Volatility Calculation — June 2024

- Created a stock pricer using the Black Scholes formula, which could calculate the price of a stock option given the stock price, strike price, time to maturity, risk-free rate and volatility, using example data from the ICE exchange.
- Used **Python** and the **Pandas** library to clean and prepare the data.
- Currently working on backtesting the model using historical data from the ICE exchange to see how well it performs, and calculating more accurate implied volatilities using numerical methods such as Newton-Raphson.

Comma.ai Self Driving Car Controller (work in progress) — June 2024

- Using **Python**, **TensorFlow** and **Pandas** to build and train a model to predict steering inputs for a self-driving car based on the current state of the vehicle (speed, acceleration, roll etc.)
- Currently working on a Recurrent Neural Network (RNN) model, improving its ability to generalise. So far it has achieved a cost of 30.7 on the validation set (a good score is 31 or below).