

## Amar Khullar

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### Personal profile

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I am an experienced software engineer, who enjoys fast paced and collaborative work environments that allow me to utilise my problem solving, teamwork and engineering skills. The last 3+ years at Netcompany has provided me with an array of experiences: building complex cloud architectures (AWS, Terraform, Python), back-end engineering legacy NHS systems, unearthing valuable insights from large datasets using Databricks, and navigating rainbow teams through complex problems - collaborating with both colleagues and stakeholders. I am keen to expand my skillset further through new experiences and technologies.

### Employment experience

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#### Netcompany – Senior Software Engineer

January 2023 – Present

**NHS Relationship Network (May 24 – Present):** Leading development to create: a relationship network datastore for [NHS PDS](#), an ingestion pipeline to add relationships to the network, and a RESTful FHIR API to expose relationships to consumers; with the goal to enable 4.5M+ children plus 350K new children per year to receive medical care by proxy via the NHS app.

- Designed and implemented an ETL data ingestion pipeline (S3, Lambdas, SQS, DynamoDB, Step Functions) to add relationship data to our Neptune datastore via GRO birth registrations, utilising a Leaky Bucket algorithm to rate limit with the [PDS FHIR API](#).
- Currently creating the Related Persons FHIR API to expose relationships to our consumers; Swagger/OpenAPI for specifications.
- Writing terraform and deploying CodePipeline, Lambdas, DynamoDB & more including writing least privilege IAM policies, across dev and PTL accounts.
- Stack: Python – Pydantic, Open API, Gherkin tests; AWS – Lambda, Step functions, SQS, S3, API Gateway, DynamoDB, Neptune.
- Weekly discussions with stakeholders to align and manage scope, user research with consumers to gather requirements.
- Working in an Agile team – running stand-ups, sprint reviews, refinements, demos and more.

**NHS Autofix (Oct 23 – May 24):** Creating the [Address Quality Service API](#) in AWS as well as integration to [NHS Spine II](#) with the purpose of adding UPRN's to the address field in [NHS PDS](#), through interfacing with the OSPlaces API; saving the NHS £200,000+ per year.

- Created a RESTful FHIR API to enrich NHS PDS address data quality; using AWS API Gateway, Glue, Lambdas and SQS utilising Infrastructure as Code (Terraform) and Python.
- Spine integration work was Python development in a complex legacy system (NHS Spine II) to call the API and handle the response within core existing workflow; using integration tests & performance tests to ensure flow wasn't disrupted. Stack: Linux, Python, NGINX, Jenkins, PyTest.
- Delivered a system that has added 1.5M UPRNs to PDS and applies 50,000 more each month, saving the NHS over £200,000 per year in vaccination letters that we don't need to send.

**NHS DQIP (Jan 23 – Oct 23):** Leading a data science team to discover pain points and automate manual processes. We implemented an ML tool to save 60s+ per case for back-office staff, saving over 4,000 hours of work per year; freeing up resources & reducing NHS backlog.

- Built a decision tree classification machine learning model in Python to identify duplicate records, involving: Data extraction, cleansing, feature selection, modelling and evaluation. Context was learnt from capturing assumptions during workshops.
- Data science and engineering work was done using Apache Databricks – writing SQL queries, PySpark user-defined functions, and utilising libraries such as NumPy, Pandas, SciPy, and SKLearn to ETL data gathered from several large NHS datasets.
- Delivered a classification model to save NBO staff over a minute per duplicate work item case, saving the NHS £80,000+/yr.

#### Netcompany – Software Engineer:

October 2021 – December 2022

- **NHS PDS (Dec 21 – Dec 22):** Full stack developer: Working in an agile team to implement new features for [NHS Spine II](#). OOP Python web development on Linux OS: stack involved Python (Flask), Ajax, Jinja2, HTML, CSS, JS (jQuery); DevOps tools used include Jenkins, Splunk, Jira & Git. Writing unit tests for both back-end and front-end features (PyTest and Selenium) as well as end to end integration tests (XML).
- **Bench (Oct 21 – Dec 21):** Worked on bids – drafting and reviewing project bids (using DOS framework) to obtain new public sector projects. Our team won 100% of our proposals, with £10m+ in bids progressed to the next stage.

#### Spookfish Innovations – Computer Vision Engineer Intern, Bristol:

June 2020 – September 2020

- Python and C++ programming to implement a ML computer vision solution for the 'Harlequin' and 'Microps' products.
- Experience gained – C++, OpenCV, implementing ML models to real problems, understanding of the computer vision sector.

#### Barbal (StandardsRepo) – Software Engineering Intern, Bristol:

June – September 2019

- Full-stack programming in an agile team using: GoLang, SQL, JavaScript, Template (HTML), CSS to develop a web application.
- Experience gained – Git, Agile, collaborative software engineering - code reviews, pair programming, sprint planning etc.

### Education and certifications

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**Certifications:** AWS Specialty Machine Learning (MLS-C01), AWS Developer Associate (DVA-C02), AWS cloud practitioner, Azure Fundamentals (AZ-900), Azure Data Fundamentals (DP-900), Azure AI Fundamentals (AI-900).

#### MSc Data Science, University of Leeds - Distinction:

September 2020 – September 2021

- Dissertation – I created and analysed my own custom dataset with the purpose of determining whether there was gerrymandering in Massachusetts in the 2020 elections, using multiple statistical methods, including Markov Chain Monte Carlo.

- Programming – Neural networks and reinforcement learning from scratch in Python, Convolutional NNs for image classification, Natural language processing, Image caption generation with LLMs (CNNs and RNNs), data analysis and statistics (multiple linear & logistic regression) using R with LaTeX reports.
- Theory – Data science, Machine learning, Statistical theory, Statistical learning, Artificial intelligence, Data mining and more.

### **BSc Computer Science, University of Bristol – Upper Second Class Honours:**

**September 2017 – June 2020**

- Programming – Implemented projects using imperative, object-oriented, functional and concurrent techniques.
- Theory – Mathematics, Data structures, Algorithms, Computer architecture, Theory of computation, Security, Machine learning, Concurrent computing, Computer Vision, Networking, Language Engineering and more.
- Dissertation group project – Developed a virtual reality game using Unity and C#.
- Solo and group projects in Java, C, C++, xC, Haskell and Python using Agile workflow and Git.
- Societies: 180 Degrees Consulting - a society in Bristol that provides pro bono consulting services to charities; I helped on consulting projects with social media data visualization for them, I was also an active organizer and member of Poker Society.

### **Tanglin Trust School, Singapore:**

**September 2007 – June 2017**

- A Level Mathematics, Physics, Computer Science, EPQ (A\*, A\*, A, A respectively).
- Y13 Project – object-oriented PHP website, designed to matchmake basketball teams and organize games.
- GCSE's 6 A\*'s 2 A's 2 B's.

### **Other skills and interests**

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#### **Skills and interests**

- I am proficient in Adobe Photoshop, Sony Vegas, Microsoft Office Suite (including VBA), I've uploaded compilation videos to YouTube and accrued 500,000+ views.
- I enjoy playing golf, football, poker and keeping active by running and going to the gym.