Nayanthara Prathap

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Ph: +6584344771 | **Eligible for UK High Potential Individual (HPI) Visa** – 2 years

Skills

Technical Skills:

Coding/Computer Science:

- Python, Java, Scala, PowerBI, HTML, JavaScript, CSS, Docker, R, SQL, git
- Software Development, Data Structures and Algorithms, Enterprise Systems Architecture
- Machine Learning, Quantitative Analysis, Data Analytics, Data Visualization

Quantum:

- Quantum Computing, Quantum Machine Learning, Quantum Algorithms, Quantum Mechanics, Qiskit, Braket, Pennylane

Non-Technical Skills:

- Stakeholder Management, Dashboards
- Communication and leadership skills
- Research, presentation and teaching skills
- Writing skills (academic+technical+blogging)

Education

Master of Computing (MComp), Computer Science – National University of Singapore (NUS), School of Computing (SoC) August 2022 – December 2023

Bachelor of Engineering (B.E.) Electronics and Communication Engineering (ECE) – Dayananda Sagar College of Engineering (DSCE), Bengaluru, India August 2018 – July 2022

Professional Experience

CENTRE FOR QUANTUM TECHNOLOGIES | SINGAPORE | January 2024 – Present

Research Assistant – Quantum Algorithms and Quantum Software

- Working with **Prof Patrick Rebentrost** Research Group on **design and analysis of quantum algorithms** and quantum circuits for implementation and benchmarking of the Classical Combination of Quantum States (CQS) algorithm on state-of-the-art quantum computers using AWS backend. Tech stack: **Qiskit**, **Braket**, **Python**.
- Exploring applications of CQS algorithm and researching if there can be a **quadratic speedup** using **hybrid quantum-classical models**.
- Working on a project for creating an SDK for 'Quantum for Finance' (q4f) module with the goal of being integrated with the QIBO framework to create a viable testing bed for banks and financial usecases.
- Developed a **Machine Learning model** for a quantum photonics problem (with Photonics Group at University of Queensland) for generating inverse design patterns using **LIME** and **Grad-CAM**; this project experiments on the amalgamation of interpretability and explainability extended to a quantum use case. Tech stack: **Python, git, Pytorch, Tensorflow**

SOFTSERVE INC | SINGAPORE | May 2023 – July 2023

R&D Intern

- Worked on projects involving various complex quantum computing and quantum mechanics concepts and algorithms. Worked on **Qiskit, PennyLane, Amazon Braket** for the projects.
- Worked on projects involving **improvement of models using Quantum Optimization Algorithms** such as VQE, QAOA, Sampling VQE, among the others. Also implemented BB84, BBM92, E91 protocols for the project-specific objectives. New projects assigned to us every week, each with a unique problem statement.
- First ever bootcamp of its kind – Quantum Bootcamp Singapore 2023, organised in collaboration with National Quantum Computing Hub (NQCH), Centre for Quantum Technologies (CQT) and SoftServe Inc. I was one among the 25 participants, selected after several rigorous rounds of interviews. [Gender ratio: **1:24**]

TARENTO TECHNOLOGIES | BENGALURU, INDIA | March 2021 – June 2021; April 2022 – June 2022

Software Intern

- Worked on the **Sunbird** project, a part of the much-celebrated **India Stack**. **Developed a program for telemetry framework specifications** for the telemetry analysis of the website using **Scala, JVM, Apache Kafka** thereby enabling collection of telemetry data from users' side for website/product improvement.
- **Visualised,** and **modelled data** for the **iGOT Karmayogi** platform and worked on creation of custom dashboards for the same. Tools used: **PowerBI, Excel, Grafana Seaborn** and **Matplotlib**.

- Coded in python for a **web-scraping project** for a **Finnish client - Metsä**. Scraped over 50 websites using **Beautiful Soup, Selenium, Docker, LXML** and **Git**. The websites included ABB, among others.
- Assisted Tarento India Toastmasters Club achieving DCP points by completing most number of levels in my pathway in record time (non-technical contribution).

SPACEONOVA | BENGALURU, INDIA | August 2020 – December 2020
Head of Logistics and **Public Relations Coordinator**

- Conducted qualitative and quantitative analysis of logistics and operations and **led cross-functional teams** in identification, pursuit, and achievement of strategic goals.
- Maintained **updated knowledge of functional technology** and leveraged information to **drive innovation**. Analysed processes and operational data to track trends, expectations and performance.
- **Stakeholder management** and **requirement analysis** for projects and map the needs of clients (customer relationship) to the project portfolio. Building space-education for population at scale.
- Led the team in **planning publicity strategies and campaigns** as well as producing presentations and press releases. Dealt with enquiries from the public and clarified them with utmost diligence.
- **Trained newly recruited interns** regarding respective roles, helped to collaborate productively and functionally, and assimilate swiftly into the company's work culture and ecosystem.

Research Experience

Graduate Research Assistant | NUS, SoC | Singapore | May 2023 – September 2023

- Worked with **Prof Prasanna Karthik Vairam** on **design and analysis of quantum algorithms for fraud detection**. This is part of my Capstone Project (8 Module Credits). [Grade achieved: **A+**]
- My research delves into the core principles of quantum computing and QSVM, highlighting their superiority in **handling large datasets with high-dimensional features**—common characteristics of credit card transaction data. The accuracy of the QSVM model turned out to be 94.18% (such a high score involved careful data analysis and data cleaning of the original dataset).

Undergraduate Research Assistant | DSCE | Bengaluru, India | July 2021 – April 2022

1. Published a research paper on an independent project where we created a **Machine Learning model to detect COVID-19** based on a person's existing comorbidities – *"Prediction of COVID-19 by Analysis of Breathing Patterns Using the Concepts of ML and DL Techniques"*. The paper was presented at the 2nd CONIT IEEE Conference held on 24th June 2022. Paper ID: 949. Paper link.
2. Published **my final year undergraduate project** as a research paper in the International Journal of Mechanical Engineering. Paper titled *"Human Detection for Search and Rescue Operations Using Convolutional Neural Networks"* published on 7th July 2022. Paper link.
3. Exhibited and presented two research projects at the 7th International Conference on Nanoelectronics, Circuits & Communication Systems (NCCS-2021) held on 30th Jan 2022. Paper ID: NCCS21051(1) & NCCS21052(2).
   (1) Recent advances in ant colony optimization strategies for design & development of algorithms for detection of cancerous cells in human beings; (2) Simulation of a nanorobotic prototype for diagnostic applications in the field of bio-medical engineering using AI and ML Concepts.

Others

- **Hobbies/Interests**: Reading, Blogging, Travelling. Playing Chess & Playing Bridge – Was part of the NUS university CCA of Chess and Bridge.
  Volunteering – "give back and grow together"
  - Volunteered for TeachSG (September 2022 – November 2022) – teaching students Math, Science and English.
  - Volunteered for GreenSG Collab for their Climate Crisis Challenge 2024 (January 2024 to June 2024), an initiative to spread awareness about the environment, green energy and climate change, among secondary school students and part of the core team for the contest planning and organization.
  - Volunteered at Robinhood Army (RHA) in India (Nov 2019 – July 2022), alleviating the poverty situation of slum-dwellers in Bengaluru by providing food and clothing, raising funds for their upliftment.
- **Memberships**: NUSS Alumni (July 2024–Present), Singapore Computer Society (SCS) (since August 2022), NUS Indian Dance (Kathak) (January 2023–Present), Toastmasters International (TI) (April 2021—March 2024) [Past President of WeSpeak Toastmasters Club, Bengaluru India (Jan 2022-Jun 2022)], Space Generation Advisory Council (SGAC) (August 2020–Present).