Asish Kumar Mandoi

Associate Software Engineer, Citrix Systems
Bachelor of Technology in Electrical Engineering
Indian Institute of Technology Kanpur

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Interests

Quantum Computing, Optimization Theory, Neuromorphic Computing

Experiences

Jul '23 – Jul '25 **Associate Software Engineer, Citrix Systems**

Core Networking Team, NetScaler Business Unit, Bengaluru, India

- Contributed to 200+ new customer adoptions in a quarter by working on two most high-visibility projects: Citrix Secure Private Access (SPA) and F5-to-NetScaler Config Converter during 2023-24
- Developed key features for SPA on Linux platforms recording a 17x user growth within a year
- Created an LLM-based tool equipped with latest intelligent prompt optimizers (DSPy) to generate NetScaler policy configurations from natural language prompts, as part of an AI Hackathon
- Carried out security upgrades to NetScaler's monitoring protocol by incorporating SNMPv3 along with the support for latest authentication (SHA256+) and privacy (AES192+) standards

Dec '21 – Apr '23 **Research Associate, QResearch Project, QWorld**

QWorld , GitHub *Optimizing Logistics using Quantum Algorithms, Mentor: Dr. Paweł Gora*

- Contributed to a working publication focused on various hybrid quantum-classical techniques to solve combinatorial optimization problems in logistics
- Validated theoretical results of 5 solvers of the Vehicle Routing Problem (VRP) by performing experiments for 550+ VRP instances on the D-Wave quantum annealers
- Devised a new efficient solver for VRP with higher performance compared to existing solvers
- Co-mentored several interns in designing QUBO formulations for VRP for a duration of 6 months
- Presented our work on Quantum Annealing based VRP formulations at two international IT conferences – Warsaw IT Days 2022 and Data Science Summit 2022

Jan '23 – Mar '23 **Quantum Computing Analyst Intern, Unisys India**

Enterprise Computing Solutions Research & Innovation Team

- Made valuable contributions to the development of a proof of concept-based prototype in collaboration with the D-Wave team to tackle large-scale Vehicle Routing
- Evaluated the commercial viability of the model by achieving near optimal solutions for datasets with over 1000 nodes in under 5 mins of runtime

Presentations

Nov '22 **A. Mandoi**, "*Quantum Annealing methods for solving the Vehicle Routing Problem*." Talk presented at **Data Science Summit 2022** , Warsaw, Poland.

Apr '22 S. Borah, **A. Mandoi**, A. Verma, "*Heuristic QUBO Formulations for solving the Vehicle Routing Problem using Quantum Annealing*." Talk presented at the 13th **Warsaw IT Days 2022** , Warsaw, Poland.

Selected Projects

Dec '22 – Jun '23 **Hopfield Neural Networks for Combinatorial Optimization**

Report *Thesis Project, Advisor: Prof. Shubham Sahay*

- Gained insight into properties of nonvolatile memory-based annealing-inspired computing accelerators for combinatorial optimization capable of near-optimal accuracy and performance
- Achieved near-optimal solutions to 800+ node optimization problems by implementing Hopfield Neural Networks and applying various stochastic and weight annealing techniques

Mar '23 – Apr '23 **Quantum Logic Gate between a Solid State Quantum Bit and a Photon**

Report *Advisor: Prof. Shilpi Gupta, EE698Y (Quantum Optics)*

- Demonstrated controlled-NOT gate behavior in a Quantum Dot (QD)-cavity system subjected to pump-probe lasers by solving the Lindblad Master Equation to obtain cavity reflection coefficient
- Reproduced the reflection spectrum by simulating a theoretical model of the QD-cavity system
- Presented project outcomes to the class, explaining the process, key ideas, and the conclusion

Mar '22 – Apr '22 **Quantum Algorithms for Semidefinite Programming and its Applications**

Report *Advisor: Prof. Ketan Rajawat, EE609A (Convex Optimization in SP-COM)*

- Studied Arora and Kale's classical algorithm based on Multiplicative Weights Update method for solving Semidefinite Programs (SDPs)
- Compared the classical complexity and lower bounds with that of the quantum extension of SDP solvers and subsequent speed-ups
- Investigated practical applications of quantum algorithms for solving SDPs like Quantum Error Recovery and Shadow Tomography

Achievements & Honours

Professional Achievements

Nov '24 **Citrix Systems**
Among top 20% employees to be awarded rating – 1 as a recognition of valuable contributions by employees throughout the year

Programming Achievements

Nov '22 **HAQS, qBraid**
Won the qBraid Open Challenge and among the top 3 contenders in the QML Challenge

Aug '22 **Quantum Excellence, Qiskit Global Summer School 2022, IBM**
Badge Among 1200 worldwide to complete the 2 week long Qiskit Global Summer School program with intensive hands-on labs focused on quantum simulations using NISQ hardware

Nov '21, Jun '22 **IBM Quantum Challenges**
Badges Among 1000 worldwide to complete challenges of *fall 2021* and *spring 2022* by solving problems in areas of finance, fermionic chemistry, machine learning and optimization

Scholastic Achievements

Jun '19 All India Rank 3592 in JEE-Advanced out of 220,000+ shortlisted candidates

Apr '19 All India Rank 7480 in JEE-Main out of 0.9 million+ candidates

May '18 National Top 300 to be selected for Indian National Chemistry Olympiad, HBCSE

Dec '17, May '18 All India Rank 322 in KVPY out of 50,000+ candidates and awarded KVPY Fellowship by Govt. of India, and IISc Bangalore

Education

Jul '19 – Jul '23 **Bachelor of Technology in Electrical Engineering**, *CPI: 7.5/10.0*
Minor in Quantum Physics
Indian Institute of Technology Kanpur, India

May '19 **Grade XII (CBSE Board)**, *Cumulative Percentage: 93.8%*
MBS Public School, Bhubaneswar, India

Jun '17 **Grade X (CBSE Board)**, *CGPA: 10.0/10.0*
DAV Public School, Bhubaneswar, India

Technical Skills

Languages C, C++, Python, Go, MATLAB, JavaScript

Web Node.js, HTML, CSS, PHP, MySQL, SQLite, Redis

Frameworks QuTiP, TensorFlow, Qiskit, Ocean, DSPy (prompt optimizer for AI models)

Utilities/Tools Git, Docker, Kubernetes, Jenkins, Splunk, LaTeX, Linux shell utilities

Relevant Coursework

Computer Science Quantum Computing, Data Structures and Algorithms, Fundamentals of Computing, Introduction to Machine Learning

Electrical Core Quantum Optics, Semiconductor Devices, Digital Communication Networks, Convex Optimization in SP-COM, Digital Control, Digital Electronics, Microelectronics

Maths & Physics Quantum Physics, Probability and Statistics, Partial Differential Equations, Complex Analysis