AAKASH MALLIK

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SUMMARY

As a final-year undergraduate, I am passionate about all things tech. Throughout my college years, I have delved into various ventures, ultimately finding a balance and deep satisfaction in research. I am particularly intrigued by the theoretical foundations of machine learning and optimization algorithms. With a knack for interdisciplinary projects, I enjoy solving puzzles that address real-world scenarios and needs. My experience in Quantum Machine Learning has reinforced my belief in its significant potential. Additionally, web development is a hobby of mine, complementing my technical skill set and fueling my creativity. Currently, I am exploring the fields of physics-informed neural networks, aiming to harness their benefits in other areas of machine learning.

EDUCATION

National Institute of Technology Karnataka, Surathkal   Dec 2021 - Apr 2025
Bachelor of Technology in Electrical and Electronics Engineering   **CGPA : 8.14**
Minor in Computer Science Engineering

National Public School, Rajajinagar   2021
CBSE, Class XII   **Percentage : 97.6%**

Presidency School, Nandini Layout   2019
ICSE, Class X, All India Rank 5   **Percentage : 98.8%**

WORK EXPERIENCE

Indian Institute of Science - Research Intern   Aug 2024 - Present

- Working in the Machine Learning team at NMCAD lab of IISC as part of **Project Urdhyuth** to design eVTOL aircrafts.
- Responsible for the **aircraft design** and **load optimization** and **aerodynamics optimization** using **FEM/FEA**, and also developement of Machine learning models to achieve the required performance.
- **Skills: Python, PyTorch**

Wells Fargo - Intern Analyst   May 2024 - Jul 2024

- Delivering solutions as part of the **Process Transformation and Intelligent Automation** team to automate manual processes by leveraging various **RPA tools**, resulting in streamlined workflows and increased operational efficiency.
- Developed a full-stack application to create a centralized platform for **algorithmic skill-based task-employee matching**, serving as a consolidated dashboard for managers and their team members. It optimizes the workflow and **reduces task allotment time** by almost **98.75%**. It also mitigates the pain point of around **1200 employees**.
- Worked on a **JIRA Ticket Classifier** model and successfully improved the accuracy of the existing model by **8.52%.**
- **Skills: Python, PyTorch, Power Apps, DataVerse, SharePoint**

IIT Delhi - Research Intern   Nov 2023 - Jan 2024

- Developed, implemented and compared a **RFE wrapped Random Forest Classifer** and a **Deep Learning model** to predict Non-Alcoholic Fatty Liver Disease (NAFLD) stages, achieving prediction **accuracy** between **84% - 97%** across 3 stages of the disease progression.
- The dataset received was a clinical dataset procured from a collaborating hospital. I worked upon cleaning the dataset by removing sparse columns, imputing appropriate data points, and pruning redundant features
- **Skills: Python, PyTorch, Data pre-processing**

NITK IEEE ASSETS conference - Web Developer   Dec 2023

- Worked as a Front-End Developer contributing in designing and coding of the official website of the IEEE conference - ASSETS using **ReactJs** modular component based architecture and **TailwindCSS** for CSS styling.
- **Skills: Javascript, ReactJs, TailwindCss**

Caarya - Business Strategist   Jan 2023 - Apr 2023

- Role included researching and collecting data on the market landscape, along with analyzing and identifying the weaknesses and strengths of our organisation as well as threats posed by the competitors and formulating KEPs.
- **Skills: Canva, Strategic thinking, Remote team work**

PUBLICATIONS

QGAPHnet: QGA Based Hybrid QLSTM Model for Soil Moisture Estimation
IEEE IGARSS 2024, Athens

- Implemented a novel pipeline of **Quantum Long-Short Term Memory (QLSTM)** with a hybrid **Quantum Genetic Algorithm (QGA)** and **Particle Swarm Optimisation (PSO)** to converge upon the global optima of the hyper-parameter subspace configuration to predict the soil moisture content. We achieved a SOTA **MSE Loss** of **0.046**.
- Upon comparison with **classical LSTM models** (with and without the hybrid optimization algorithm in the pipeline) we found that the hybrid QLSTM model worked **9570 times better** than a vanilla LSTM model (**MSE Loss- 1.079**)
- **Skills: Quantum Machine Learning, Particle Swarm Optimisation, Quantum Genetic Algorithm, Pytorch**

PROJECTS

QGAPHEnsemble: Adaptive Weighted Hybrid QLSTM Ensemble for Short Term Weather Forecasting

- Implemented a novel architecture combining **Hybrid QLSTM Network Ensemble** via **Adaptive Weighting** for Short Term Weather Forecasting achieving SOTA results: (**MAPE of 0.91**) for **BO-QEnsemble model** and **0.92** for **GenHybQLSTM model**.
- Upon comparison with **classical sequential models** (with and without the hybrid optimization algorithm in the pipeline) we found that the best performing model BO-QEnsemble model **MAPE- 0.91** performed **54.04 times better** than the benchmark Gated Recurrent Unit (GRU) (**MAPE - 1.98**)
- **Accepted** for publishing at **IEEE WCCI 2024, Okohama** conference **(an A grade conference)**, however it had to be withdrawn due to insufficient funds to proceed with the registration.
- **Skills: Quantum Machine Learning, QLSTM, Bayesian Optimization, Quantum Genetic Algorithm, Particle Swarm Optimization, Pytorch**

Natural Language Processing Automation WebApp
Nov 2022- Feb 2023

- Created a responsive web-app that allows users to perform various Natural Language Processing tasks and also allows them to build their own custom neural network by taking in activation function and number of layers as input.
- Built a Natural Language Processing (NLP) model for performing Targeted-Aspect Based Sentiment Analysis by processing Twitter US Airline reviews with **BERT and CodeBERT.**
- **Skills: TensorFow, Keras, Pandas, HTML, CSS.**

SKILLS

Programming Languages	C++, Python, JavaScript, Rust(learning)
Frameworks	PyTorch, Tensorflow, Keras, NextJs, ReactJs, Tailwind CSS
Tools and Technologies	MongoDB, SQL, Git, GitHub, PostMan
Soft Skills	Communication, Leadership, Teamwork, Problem Solving, Creative Writing

COURSES UNDERTAKEN

Advanced Calculus	**Differential Equations**	**Physics**
Digital Signal Processing	**Digital System Design**	**Linear Control Theory**
Probability & Statistics	**Machine Learning**	**Neural Networks and Applications**
Database Systems	**Operating Systems**	**Data Structures and Algorithms**

HONORS AND AWARDS

- **KVPY (Kishore Vaigyanik Protsahan Yogna) SX 2021**- **All India Rank 1373** out of 0.6 Million Candidates.
- **JEE Advanced 2021**- Ranked in **top 4% percentile** out of 0.25 million candidates.
- **JEE Mains 2021**- Ranked in **top 0.7% percentile** out of 1.2 million candidates.
- **Class X Indian Council of Secondary Education (ICSE) 2019** - **All India Rank 5** with 98.88% aggregate score.
- **ASSET Aptitude Exam 2016** - All India Rank 1.

EXTRA-CURRICULAR ACTIVITIES

- **Executive Member & Chief Editor - ACM NITK Student Chapter** — Nov 2022 - Present
- **Curator - TEDx NITK Surathkal** — Jun 2022 - Nov 2023
- **Content Writer - Incident - Annual Cultural Fest NITK** — Aug 2022 - Mar 2023