

Ayush Naique

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EDUCATION

New York University - Courant Institute of Mathematical Sciences

Masters in Computer Science, CGPA: 3.89/4

New York, NY

May 2025

National Institute of Technology, Goa

B.Tech in Computer Science and Engineering, CGPA: 8.99/10

Goa, India

May 2023

TECHNICAL SKILLS

Languages: Python, C/C++, OCaml, Scheme, Java, SQL, MongoDB, JavaScript, HTML/CSS, Scala, Ada

Frameworks: React, Node.js

Tools and Libraries: Git, VS Code, Visual Studio, Jupyter, pandas, NumPy, Matplotlib, SciPy, Tensorflow, Scikit learn

Relevant Courses: Algorithms, Operating Systems, Compiler Construction, Computer Vision

EXPERIENCE

Research Intern - Machine Learning

Jun. 2022 – Sep. 2022

National Center for Polar and Ocean Research

Goa, India

- Developed and implemented Deep Learning models to forecast polar weather at the Bharati Antarctic Research Station, leveraging Time Series data with a focus on LSTM, RNN, and Sequence2Sequence architectures.
- Conducted impactful research on seasonality trends in time-series data, employing advanced techniques such as PCA and discriminant analysis for feature extraction and mitigating seasonal effects.
- Demonstrated expertise in parameter optimization, resulting in significant improvements in model accuracy. Collaborated effectively with peers to identify and implement optimal prediction models, achieving exceptional performance metrics with LSTM and Seq2Seq-based LSTM models, including an RMSE of 0.009 and MAE of 0.006.

Intern - Data Science

Jan. 2022 – Mar. 2022

Smartknower Ltd

Bangalore, India

- Implemented and fine-tuned clustering algorithms to develop robust classification models.
- Utilized Census Database to curate a comprehensive dataset for classification tasks, effectively categorizing the Indian populace based on credit scores and related factors.
- Developed prediction models employing Bayesian Classifier and Random Decision Forest algorithms in Python, leveraging libraries like Scikit-Learn and SciPy for efficient implementation and analysis.

PROJECTS

Compile-time Optimizations for Iteration and Recursion

Feb. 2024 – Present

- Specializing in optimizations throughout the compilation pipeline, particularly targeting iteration and recursion during code generation.
- Implementing strategies to recognize and optimize tail recursive functions by applying Tail Call Optimization.
- Planning to incorporate techniques such as loop invariant removal and loop unrolling to further enhance performance and efficiency.

Multimodal Image Colourization using Diffusion

Feb. 2024 – Present

- Focused on leveraging diffusion models to optimize image colourization processes and bolster their self-learning capabilities.
- Exploring innovative architectural modifications and integrating diverse multimodal features, such as incorporating video clips as input data.
- Conducting comprehensive data pre-processing and augmentation to enrich the training dataset. Responsible for overseeing the training and inference procedures of diffusion-based image colourization models.

Indian Dialect Classifier

Sep. 2021 – May 2023

- Developed a speech detection system specialized in classifying Indian dialects.
- Implemented dialect classification using diverse models including Artificial Neural Networks, Support Vector Machines, and Ensemble Models, leveraging phonetic and spectral features from Konkani and Kannada datasets.
- Utilized advanced embeddings like Wave2Vec, X-Vectors, and Bottleneck Features for feature extraction.
- Achieved notable accuracies of 86% on LSTM and 88% on ANN models, surpassing benchmark SVM classification accuracy by 4%.

Operating System Simulation

Sep. 2023 – Dec 2023

- Orchestrated the simulation of essential Operating System components, including Linkers, Schedulers, Memory Management Unit (MMU), and Disk Scheduling algorithms.
- Crafted a two-pass linker with capabilities for amalgamating individually compiled code/object modules into a unified executable. Implemented functionalities for resolving external symbol references and executing module-relative addressing.
- Developed and assessed the performance of diverse process scheduling algorithms, such as First-Come-First-Served (FCFS), Last-Come-First-Served (LCFS), Shortest Remaining Time First (SRTF), Round Robin, Priority, and Preemptive Priority, utilizing Discrete Event Simulation techniques.
- Engineered a robust Memory Management Unit (MMU) to facilitate the mapping of virtual address spaces onto physical frames. Incorporated advanced page table translation mechanisms and supported various page replacement algorithms, including FIFO, Clock, Not Recently Used (NRU), Aging, and Working Set.

Relocating SIC Assembler

Jan. 2021 – May 2021

- Developed a relocatable program assembler for a 20-bit Simple Instructional Computer (SIC) in C++, capable of generating object code from machine instructions.
- Utilized Object-Oriented Programming principles to structure the assembler tables and enhance modularity.