ABHINAV GANESH

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EDUCATION

The University of Texas at Austin, Austin, TX **May 2025**
Bachelor of Science in Computer Science **GPA: 3.9220/4.0**
Bachelor of Science in Mathematics
Certificate in Applied Statistical Modeling
Relevant Coursework: *Data Structures; Computer Architecture; Operating Systems; Algorithms; Statistics; Quantitative Finance; Stochastic Processes; Information Retrieval; Machine Learning; Essentials of AI; iOS Mobile Computing; Ethical Hacking; Cryptography*
National University of Singapore - Semester Exchange Jan 2023 - May 2023

EXPERIENCE

Esri, Redlands, California (*Software Development Intern, Field Maps Team*) May 2024 - August 2024
- *TypeScript, Playwright, StencilJS, Ember, OpenAI API, Python, Selenium*
- Created framework to automate **end-to-end testing** workflows for web applications from Natural Language (NL) descriptions using **Reinforcement Learning (RL)** and **Large Language Models (LLMs)**. Working on publishing **research paper**.

Esri, Redlands, California (*Software Development Intern, Field Maps Team*) May 2023 - August 2023
- *TypeScript, StencilJS, ArcGIS, Python, LangChain, Chroma, FAISS, OpenAI API, LLaMA, HuggingFace*
- Created **NL interfaces** to simplify tasks such as creating maps and building forms; created **Retrieval Augmented Generation (RAG)** systems with **over 90% correctness**. Experimented with combinations of chunking algorithms, Information Retrieval systems, and LLMs.

UnitedHealth Group/Optum, Remote (*Intern - Data Engineer Team*) June 2022 - August 2022
- *Full-stack development (Java, Spring, HTML/CSS/JavaScript), SQL*
- Developed internal tool with in-line editing for efficient **comparison of databases** during migration from on-prem to cloud. Took lead on webpage creation and Spring Boot API. Estimated to reduce time spent on developing queries **by 40%**.

RESEARCH

Seton Stroke Institute/Department of Neurology, Austin, Texas (*Undergraduate Research Assistant*) January 2022 - Present
- *Python, R, pybids, nilearn, ANTs, OpenCV, Docker, multiprocessing*
- Developed Computed Tomography (CT) **image processing** pipeline used on clinical stroke data to determine sex differences in stroke outcomes. Implemented customized **Machine Learning** (ML) techniques to process **low resolution image data**.
- Contributed to **open source** image processing libraries (ANTs, CT BET) and built Quality Assurance modules to validate image segmentation results for other teams in lab.

Quantitative Criticism Lab, Austin, Texas (*Undergraduate Research Assistant*) December 2023 - Present
- *Python, Tensorflow, BERT*
- Implemented **context-based quote retrieval model** for Latin corpus to facilitate analysis of evolving perspectives on social constructs (e.g. equality, loyalty, etc.) through literature. Implemented Neural Network model to reduce error (MAE) **over 85%** from prior study.

Hutter Research Group, Austin, Texas (*Undergraduate Research Assistant*) August 2021 - August 2023
- *Python, Scikit-learn, Seaborn, Pandas, NumPy, Matlab*
- Performed **data analysis** and built customized **visualization tools** to investigate gas ionization characteristics and sensor data to aid with design of portable gas sensor.

PROJECTS

Parallelization of Novel OCR Error Correction Algorithm April 2024 - May 2024
- *OpenMP, C++*
- Parallelized algorithm to correct results from Optical Character Recognition (OCR); **over 35x faster** than sequential code with **same accuracy**. Tested configurations across multiple levels of parallelization, caching, and data sizes.

HMM-based Word Recognizer (Speech-to-Text) March 2024 - April 2024
- *Python, PyTorch, NumPy*
- Built MFCC **acoustic feature extraction** pipeline followed by **isolated word recognizer** utilizing Hidden Markov Models (HMM's) to predict spoken words based on audio input (.wav).
- Implemented **core algorithms** from scratch: sequence scoring (forward algorithm), state-level decoding (Viterbi algorithm), and transition matrix optimization (Viterbi training with Maximum Likelihood Estimation).

CurbCut: A Mobile Application for Accessibility-Focused Routing July 2023
- *Kotlin, Flask, ArcGIS Maps SDK for Kotlin, PRAW, OpenAI API*
- Android application to provide routes avoiding accessibility barriers based on user preferences, along with social media and chat interface functionality for help. **Finalist** team (top 8) in Esri intern Hackathon; presented to several hundred professionals.

NUS Arts Festival 2023 - *Light Years, Week Days*, Singapore, Singapore January 2023 - May 2023
- Collaborated with interfaculty team and professors to design and create wind chimes and **capacitive touch keyboards** using arduino. Debuted as **interactive art installation** outside NUS' YST Conservatory of Music.