

Caleb Key

calebkey121@gmail.com ❖ (903) 910-8324 ❖ San Antonio, TX

Education

Texas A&M University

BS, Computer Engineering

- Graduated *Cum Laude*, GPA: 3.5

August 2018 – May 2022

College Station, TX

Work Experiences

Air Force - 90th Cyber Operations Squadron

Cyber Capabilities Developer GG-11

June 2022 – Present

San Antonio, TX

- Active Top Secret security clearance
- Developed advanced cyber capabilities in support of offensive and defensive cyberspace operations, including:
 - Malware replication software with real-time command execution and user interface for operators
 - Locally hosted LLM platform supporting information security and personalized use cases
 - AI powered translation tools with custom interfaces
- Contributed to developing **NIPRGPT**, DoD's primary LLM platform utilized by over 360k active users
 - Spearheaded development of 'Shared Workspaces', enabling RAG-driven collaboration and file sharing
 - Installed the high-performance AI compute systems powering NIPRGPT and identified optimizations that improved benchmark throughput by 30%
 - Researched and implemented novel pre-training methodologies utilizing synthetic datasets
- Top 1% selectee for the **DAF - MIT AI Program**, an Air Force research fellowship with MIT
 - Worked on an established FastAI team that specializes in portable, high-performance AI applications
 - Researched advanced CAG techniques to optimize the performance of the NIPRGPT RAG pipeline

Portfolio Projects

Handwritten Digit Recognition

- Built a handwritten digit recognition system with a custom neural network from scratch, achieving 95% accuracy on the MNIST dataset
- Developed a Tkinter-based grid editor in order to draw digits for real-time inference by the neural network

Optimization of CPU Cache Eviction using Genetic Algorithms

- Created a C++ program implementing genetic algorithms to optimize CPU cache eviction strategies, experimenting with various crossover types and mutation rates
- Simulated CPU cache to benchmark the genetic algorithm's performance

Card-Based Strategy Game

- Developed a full-stack strategy card game with React frontend, Python/Flask backend
- Integrated multiple reinforcement learning models to autonomously play the game against each other

Skills & Interests

- **Skills:** Python, C, C++, Large Language Models, Retrieval-Augmented Generation, RL Algorithms
- **Interests:** Evolutionary Algorithms, Computer Graphics, Reinforcement Learning, Computer Hardware

Addendum: Prerequisite Coursework

- **CSCE 222** – Discrete Structures in Computing | Grade: **A**
 - Fulfills Discrete Math for Computer Science (**CS 311**)
- **CSCE 121** – Introduction to Programming Design Concepts | Grade: **B**
 - Fulfills Introduction to Programming (**CS 312**)
- **CSCE 221** – Data Structures & Algorithms | Grade: **A**
 - Fulfills both Data Structures (**CS 314**) and Algorithms & Complexity (**CS 331**)
- **MATH 311** – Topics in Applied Mathematics I | Grade: **A**
 - Fulfills Linear Algebra and Matrix Theory (**M341**)
- **ECEN 303** – Random Signals & Systems | Grade: **A**
 - Fulfills Introduction to Probability and Statistics (**SDS 321**)
- Introduction to Data Mining (**CS 363D**)
 - While I have not taken a formal course in data mining, my role on the NIPRGPT project involved extensive data preprocessing, pattern recognition, and anomaly detection—experience that mirrors the core objectives of a dedicated data mining course.