

# Quan Tran

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## OBJECTIVE

Computer science student with experience in backend systems, data infrastructure, and applied machine learning, seeking a Software Engineering role to build scalable, reliable, and impactful products.

## EDUCATION

**Rice University – B.S. Computer Science (GPA 3.86/4.0) – Aug 2022 – Dec 2025**

**Houston, TX**

- Relevant Courses: Computer Vision, Quantum Computing, Software Methodology, Practical Machine Learning, Concurrent Program Design, Compiler Construction, Intro to Computer Systems, Tools and Models for Data Science, Probability and Statistics, Intro to Program Design, Reasoning about Algorithms, Linear Algebra, Fund. Computer Engineering

## WORK EXPERIENCES

**Rice University Computer Vision Lab – Research Intern – May 2025 – Present**

- Built a full-stack annotation tool with JavaScript front end and Python backend (Flask, OpenCV) to evaluate rigid object tracking performance
- Enabled dynamic point and line selection, real-time track visualization, and seamless integration with models such as CoTracker3 and PIPs++
- Designed backend architecture for loading video data, managing tracker configuration, and multi-model support
- Benchmarked state-of-the-art trackers through both visual analysis and quantitative metrics to identify edge cases and performance bottlenecks
- Currently working on fine-tuning and training models for test-time optimization to improve rigid shape tracking on unseen data

**HP/Poly – Software Engineer Intern – May 2024 – August 2024**

- Developed an end-to-end Python framework using Zoom Rest API for automated testing, enabling Zoom Rooms configurations before and after testing to validate and certify software for Zoom
- Integrated the framework with the current Jenkins pipelines for minimal configurations when setting up and creating new test cases
- Collected and benchmarked Quality of Service data to evaluate live video performance in real-time test environments
- Refactored legacy codebase to double data retrieval speed and improve API efficiency

**VNG Cloud – Software Engineer Intern – June 2023 – August 2023**

- Built a scalable ML-based anomaly detection system to monitor cloud server traffic for millions of users, improving incident response time by 30%
- Evaluated time-series models (Holt-Winters, Prophet, ARIMA) and built an online-learning system that improved detection performance by 10% over baseline on seasonal traffic data
- Integrated a relational database to log and trigger user alerts on server traffic anomalies, with average delivery latency under 3 seconds
- Collaborated with cross-functional teams to deploy the alert system within the existing monitoring infrastructure

## PROJECTS

**Text-Based Game Editor and Engine – January 2025 – May 2025**

- Led the UI/UX development team and coordinated design discussions to ensure seamless integration with backend systems
- Managed the database team by using CosmosDB and Redis to support scalable, real-time data storage
- Simulated 500 concurrent users during load testing to identify bottlenecks in CosmosDB and Redis-backed real-time operations
- Collaborated cross-team to integrate backend infrastructure with frontend editor features and conducted end-to-end testing

**Wearable Exoskeleton – November 2024 – May 2025**

- Explored EMG and IMU-based control strategies for exoskeletons to detect user intent via muscle and motion signals
- Processed raw EMG signals using basic filtering and thresholding to extract muscle activity patterns for potential control input
- Investigated combining EMG and IMU sensor data to improve motion prediction accuracy and response time
- Evaluated low-latency communication protocols (I2C, SPI) for real-time signal acquisition and processing in embedded systems
- Led early-stage technical planning within a student team, coordinating efforts across sensing, hardware prototyping, and safety considerations

**Messaging App – October 2024 – December 2024**

- Built a real-time messaging framework with a custom NoSQL backend in Go, optimized for speed and scalability
- Designed intuitive user interfaces with the focus on accessibility using HTML, CSS, and Typescript frameworks
- Integrated database storage for users, message history, and conversation metadata, optimizing query efficiency to support fast message retrieval

**OwlDB – Custom NoSQL Database – August 2024 – October 2024**

- Developed an extensible NoSQL database with RESTful APIs and high-concurrency support, simulating real-world backend frameworks
- Designed and implemented robust APIs in Go to support seamless CRUD operations, integrating with frontend systems via structured endpoints
- Leveraged Go's concurrency features to high-volume requests efficiently
- Achieved 92% code coverage through extensive unit and integration testing, improving reliability

**H.O.L.L.Y. – December 2023 – August 2024**

- Created a productivity device that transforms any flat surfaces into interactive screens using computer vision
- Implemented lens correction algorithms for accurate hand gestures tracking
- Designed an intuitive user interface with projection mapping to navigate through apps using Kivy library
- Integrated large language models (LLMs), speech recognition, and text-to-speech technologies for a personalized assistant

## SKILLS

**Programming Languages:** Python, Go, Java, C++, C, C#, TypeScript, JavaScript, Bash, R, Assembly, HTML/CSS

**Frameworks & Libraries:** React, TensorFlow, PyTorch, Pandas, NumPy

**Cloud & DevOps:** AWS, Azure, Docker, Jenkins, Git, CI/CD, Postman

**Databases & Storage:** NoSQL (MongoDB, Redis, CosmosDB), Relational (MySQL), GraphQL

**Software Architecture & Systems:** Object-Oriented Programming, Concurrent Programming, RESTful APIs, Model-View-Controller (MVC), Event-Driven Architecture, Client-Server Model

**Data Science & Machine Learning:** Regression Models, Time-Series Forecasting (Holt-Winters, Prophet, ARIMA), Anomaly Detection, NLP, Deep Learning, Regularization, Cross-Validation, RNNs, CNNs, Spark, Hadoop

**Cloud Platforms:** Azure, AWS

**Dev Tools:** Git, Jenkins, Docker, CI/CD, TCP/IP Networking, Postman

**Database:** Relational Database, GraphQL, SQLAlchemy, NoSQL, MySQL, MongoDB, CosmosDB, Redis Cache

**Architecture:** Object Oriented Programming, Concurrent Programming, Model-View-Controller, RESTful, Client-Server Model, Event-Driven

**Data Science:** Regression Model, Deep Learning, Regularization, Cross Validation, Natural Language Processing, Pandas, NumPy, Forecast Models, Anomaly Detection, Recurrent Neural Networks, Convolutional Neural Networks, TensorFlow, Pytorch, Spark, Hadoop

#### **Concurrent Proxy – April 2024**

- Designed and implemented a concurrent server proxy to handle multiple concurrent client requests
- Utilized multithreading for efficient connections handling, improving response time
- Implemented logging functionality to keep track of server traffic and performance

#### **Python Code Automated Tester – September 2023 – December 2023**

- Designed a large scale program that auto-generates black box test cases for a function with a set of specifications and evaluates the accuracy of a Python implementation
- Implemented a greedy algorithm that generates a set of test cases to detect a large number of buggy implementations
- Generate a small set of test cases based on a small number of buggy implementation that can detect a large number of buggy implementations

#### **Disease Infection Analysis – April 2023 – May 2023**

- Conducted a comprehensive analysis of patients' genome to detect patterns of the transmission of the disease
- Implemented a Rooted Directed Minimum Spanning Tree in python to calculate the transmission map of likelihood from one patient to another with a given patient zero

#### **Network Attacks and Analysis – February 2023 – March 2023**

- Simulated various attacks on highly connected networks and analyzed the resiliency of Erdos Renyi, RF7, and UPA networks from random and targeted attacks
- Determined that Erdos Renyi network is the most resilient against targeted attacks above 50 nodes, and UPA network is most resilient against targeted attacks below 50 nodes

#### **Model Rocket Flight Control System – May 2022 – August 2022**

- Prototyped a Thrust Vectoring Control (TVC) System to stabilize the rocket on the descend using the accelerometer, gyroscope, and altimeter
- Developed Proportional, Integral, Derivative (PID) controller algorithms for fast error correction, and stable ascend/descend

#### **Embedded Software for Motion-Activated Lightsaber Effects – Jun 2022 - Jul 2022**

- Created a full-metal lightsaber hilt using off-the-shell parts with ignition, retraction, clashing, and swinging light animation and sound.
- Developed motion *algorithms* using accelerometer and gyroscope data from MPU6050 for smooth lightsaber ignition, swing, strike, and retract animations and sounds.
- Accessed audio files to play various sounds according to the motion of the lightsaber.

#### **Embedded Software for Motion-Activated Lightsaber Effects – Jun 2022 - Jul 2022**

- Engineered a motion-responsive lightsaber using MPU6050 sensor data to drive ignition, swing, clash, and retraction effects
- Developed real-time motion algorithms in C++ for smooth light animations and dynamic sound playback based on movement
- Integrated an embedded system to process accelerometer and gyroscope inputs, triggering corresponding sound effects and LED animations

## **LEADERSHIP**

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#### **Rice EXO - Co-President – 2024 – 2025**

- Established a new club focused on the design, development, and testing of exoskeleton suits to enhance human strength and mobility, creating opportunities for interdisciplinary collaboration among engineering students
- Led recruitment efforts, growing membership to include students with diverse expertise in mechanical design, robotics, and biomechanics
- Designed and implemented projects exploring advanced exoskeleton technologies, including control simulators and wearable prototypes, with an emphasis on safety, efficiency, and user experience
- Promoted innovation and risk management by developing a comprehensive plan addressing emotional, financial, and operational risks associated with exoskeleton development
- Explored control strategies for wearable exoskeleton systems using EMG and IMU sensors to detect user intent through muscle activation and joint motion
- Processed raw EMG signals using basic filtering and thresholding to extract muscle activity patterns for potential control input
- Investigated sensor fusion techniques combining EMG and IMU data to improve motion prediction accuracy and response time
- Evaluated low-latency communication protocols (I2C, SPI) for real-time signal acquisition and processing in embedded systems
- Led early-stage technical planning within a student team, coordinating efforts across sensing, hardware prototyping, and safety considerations

#### **Market Prediction for Housing Prices – October 2024**

- Developed regression models to predict Houston home prices, utilizing data preprocessing and feature engineering to optimize performance.
- Analyzed neighborhood pricing trends, visualizing geographic distributions and key features to provide actionable market insights.
- Enhanced predictive accuracy by 50% over the baseline, supporting data-driven property valuation and competitive pricing strategies.

Cloud Platforms: Azure, AWS

Dev Tools: Git, Jenkins, Docker, CI/CD, TCP/IP Networking, Postman

Database: Relational Database, GraphQL, SQLAlchemy, NoSQL, MySQL, MongoDB, CosmosDB, Redis Cache

Architecture: Object Oriented Programming, Concurrent Programming, Model-View-Controller, RESTful, Client-Server Model, Event-Driven

Data Science: Regression Model, Deep Learning, Regularization, Cross Validation, Natural Language Processing, Pandas, NumPy, Forecast Models, Anomaly Detection, Recurrent Neural Networks, Convolutional Neural Networks, TensorFlow, Pytorch, Spark, Hadoop

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