

# Sanjit Thangarasu

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## EDUCATION

University of Maryland - College Park | B.S. Computer Science

Expected Dec. 2024

- Relevant Coursework: Object-Oriented Programming (Java), Computer Systems (C and Assembly), Linear Algebra, Discrete Math, Statistics, Advanced Algorithms, Computational Finance, Web Application Development, Data Structures

## SKILLS

**Languages:** JavaScript, TypeScript, Java, Swift, Python, R, C, HTML, AVR and MIPS Assembly, OCaml, Rust

**Frameworks:** Node, React, Express, Firebase, MongoDB, Tensorflow, Jupyter Notebook, MapBox API

**Other:** SF-85 Active Security Clearance, AWS (Lambda, Cloudformation, DynamoDB, API Gateway), Git, CI/CD, Docker, Arduino

## EXPERIENCE

**Software Engineering** - Department of Homeland Security (USCIS ) | Washington, DC

Jan. 2024 - Current

- Led the React migration for USCIS's Electronic Immigration System (ELIS), transitioning critical components from Angular.js to **React.js**, enhancing the application process for millions of users.
- Developed and integrated sophisticated React components, managed API communications with Java backends, and ensured accurate database transactions for forms H1B, I-918, I-918A, N-400, and I-485, utilizing **Docker**, **DBeaver**, **Jenkins**, and **GitHub**.
- Wrote **JUnit** tests to increase code coverage, ensuring robust and reliable software performance.
- Enhanced codebase efficiency and reliability, driving improvements in the **CI/CD** pipeline through extensive codebase enhancements.
- Merged over **5,500 lines** of code, significantly contributing to the project's development and stability.

**Software Engineering** - REI Systems | Sterling, VA

May. 2023 - Jan. 2024

- Elevated from an intern role to a lead position due to exemplary performance, spearheading enhancements to an internal project viewing tool.
- Integrated modern technologies such as **React**, **Java**, **AuroraDB** with **MySQL**, and **ElasticSearch** to develop an interactive user interface, optimizing user experience with advanced search and filter capabilities.
- Utilized **AWS** services including **VPC**, **EC2**, **S3**, **Lambda**, and **CloudFormation** to build and maintain scalable and secure cloud infrastructure.
- Created a **Single Sign-On (SSO)** service for the entire company, a first-time implementation, and assisted other teams in adopting this SSO solution using **Microsoft Azure OpenID**.

**Senior Quant Analyst** - Apex Quant UMD | College Park, MD

Jan. 2023 - Current

- Led the software team to ensure efficient project execution and high-quality outputs.
- Designed and implemented a specialized risk management tool using yfinance API, **Python**, and **TensorFlow**.
- Utilized an **LSTM neural network** and various risk metrics to perform granular risk evaluations at both portfolio and individual asset levels, reducing portfolio risk by **40%** and potential loss by **20%**.
- Provided mentorship and guidance to junior team members, fostering their development in quantitative analysis and software engineering principles.
- Conducted regular teaching sessions on advanced topics such as machine learning algorithms, financial modeling, and risk assessment techniques.

**Software Engineering Intern** - Digital Infuzion | Rockville, MD

Jun. 2022 - Oct. 2022

- Designed and deployed a **serverless API** to streamline the query, storage, tagging, and sharing of medical journals and publications.
- Maintained full-cycle ownership of the project, leading grooming sessions and demos, which enhanced team collaboration.
- Integrated AWS services such as **Lambda**, **CloudFormation**, **DynamoDB**, and **API Gateway**, creating a scalable API infrastructure now supporting hundreds of users.

## PROJECTS

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### High-Frequency Trading Server written in RUST w/ Blockchain Integration | [GitHub 1](#) | [GitHub 2](#)

- Developed a **high-frequency trading server** using **Rust** and **Solidity**, integrating **Redis** for data storage and a **Web3** interface for blockchain-based order book interactions.
- Implemented order matching logic supporting **Limit**, **Market**, and **Stop** orders, ensuring robust and efficient trading operations.
- Utilized **Actix-web** for handling HTTP requests and **WebSocket** for real-time communication, ensuring low-latency performance.
- Integrated **JWT** for secure user authentication and authorization, enhancing the platform's security and user management.

### Riskify - Portfolio Risk Analysis and Management Software | [GitHub](#)

- Developed Riskify, a **Python-based** tool that evaluates the risk associated with individual stocks and overall portfolios using machine learning models and advanced statistical techniques.
- Utilized a multi-output neural network to calculate risk scores for individual assets based on various technical indicators, including volatility, Sharpe ratio, SMA, EMA, RSI, Bollinger Bands, VaR, and momentum.
- Normalized historical stock data, applied **PCA** for dimensionality reduction, and created sequences for training **LSTM** models.
- Enabled users to adjust their portfolios based on risk forecasts, maximizing returns while maintaining desired risk levels.

### Aux-GPT AI DJ Application | [GitHub](#)

- Developed Aux-GPT, a **React** and **Node.js** based web application that integrates **OpenAI's GPT model** with **Spotify's Web API** to generate personalized music queues.
- Implemented a chatbot interface using **OpenAI's GPT-3.5** to interpret user queries and dynamically create Spotify playlists, enhancing user interaction and music discovery.
- Utilized Spotify's user preference data and **OAuth authentication** to personalize music recommendations, demonstrating proficiency in API integration and data-driven development.

### Poolesville Event Sign Up Application | [GitHub](#)

- Achieved a record **40%** increase in ticket sales for Poolesville HS events and reduced wait times by over **70%**
- Serviced over **6,000** requests and continues to be in use even after graduation
- Developed a full stack web application using **Node.js**, **Express.js**, **Bootstrap**, **Firebase**, **Heroku**, and **HTML**

### Source America Design Challenge | [GitHub](#)

- Designed and delivered a **machine learning based iOS app** for visualizing and tracking denominations of change at a Square-POS cash register for people with developmental disabilities
- Programmed the logic and functionality of the application using **Swift**, **Square API**, **CoreML**, and the **YoloV3** model
- Awarded National Semi-Finalist and Media Awareness Award for excellent documentation and execution of a project that effectively aided people with disabilities in the workplace

### Lung3D - A Novel, Deep Learning Algorithm for Lung Cancer Detection | [GitHub](#)

- Designed a **UNET-based machine learning algorithm** for CT lung scans, achieving **96%** accuracy in isolating cancerous regions, outperforming current radiologist methods and reducing processing time by **90%**.
- Models the lung tumor in 3D space, graphs the tumor growth over time, and predicts life expectancy of patients

### AccessO2 - An Innovative, Non-electric, Life saving, Oxygen Concentrator | [Abstract](#)

2016 - 2019

- In 2015, a flood struck the MIOT hospital in my hometown of Chennai, India and as a result 18 ICU patients died due to a lack of concentrated oxygen. This incident made me find a solution to this problem.
- Researched, designed, and engineered a prototype aimed at providing concentrated oxygen to underdeveloped countries.

- Developed a fully functioning, non-electric oxygen concentrator able to generate **80% concentrated oxygen** at a flow rate of **1.5 L/min**
- Project spanning 3 years and won awards at the regional, state and international competitions (ScienceMontgomery, Google Science Fair, Intel International Science Engineering Fair (ISEF) respectively )