Abhishek Subramanian

github.com/AbhishekSubramanian linkedin.com/in/abhishek-subramanian/ abhisheksubramanianofficial@gmail.com

Education

Virginia Tech **Blacksburg, VA**
Master of Science in Computer Engineering - AI/ML and SWE concentration (**GPA 3.7 / 4.0**) *Aug 2024 – Dec 2025*

- Relevant Courses: Advanced Machine Learning, Computer Vision, Natural Language Processing, Advanced Technological Singularity, Deep Learning.

College of Engineering, Guindy (Anna University) **Chennai, India**
B.E. Electronics and Communications Engineering (**GPA 8.01 / 10.00**) *Aug 2018 – Apr 2022*

- Relevant Courses: Data structures and Object Oriented Programming, Operating Systems, Soft Computing

Professional Experience

Quantiphi **Bengaluru, India**
Full-Stack Software Developer *Aug 2022 – May 2024*

NVIDIA's Digital Avatar Solution

- Crafted and built a responsive frontend using **Figma**, **React.js**, and **Material UI** to interact with NVIDIA's Digital Avatar, powered by Llama's 33B LLM, incorporating a RAG pipeline to augment responses with real-time, contextually relevant information retrieval.
- Achieved a **30% reduction in load time** and increased UI responsiveness through **software optimization**, improving **frontend-backend communication** for real-time context-aware interactions.
- Enabled **real-time captions and chat functionality** using **NVIDIA Riva's ASR and TTS components**, enhancing user experience and accessibility.

Magical Bridge Foundation

- Led the **backend development** for a project entailing **intelligent music synthesis using machine learning**, implementing **authentication systems, music configurators, and server monitoring tools**.
- Devised a secure **MySQL database** that supports **100+ concurrent users** and **optimized data handling through multithreading and parallel computing**, developing **scalable Flask APIs** with **CORS and WebSockets** for **real-time frontend communication**.
- **Reduced deployment time by 40%** by containerizing the entire application using **Docker**, enhancing **scalability and maintainability**

Starbucks AI Assistant

- Developed a **Generative AI-powered Digital Avatar chatbot** for Starbucks, enabling curated drink recommendations through a scalable, user-friendly application built with a **React.js** frontend and an **Express.js backend**, leveraging **Tokkio's framework**.
- Engineered **gRPC API calls** to enable real-time processing and communication between NVIDIA Riva & Tokkio microservices and text-based input systems.

Skills

Programming Languages: Python, JavaScript, TypeScript, SQL, C++, C#, Objective-C, Java, HTML, CSS, Matlab, Kotlin, R.
Frameworks and Tools: Flask, Node.js, MySQL, PyTorch, TensorFlow, Git, Linux, NoSQL Firebase, React.js, Redux, Material UI, Bootstrap, Figma, Pygame, paho-mqtt, Pandas, Android Studio, Hadoop, FastAPI, PySpark, MongoDB, React Native.
Cloud and DevOps: Google Cloud Platform (GCP), NVIDIA Avatar Cloud Engine (ACE), Docker, Kubernetes, Prometheus, AWS.
Professional Certifications: Google Cloud Certified: Associate Cloud Engineer and Professional Cloud Developer

Selected Projects And Publications

Enhancing Emotional Well-Being through ML based Music Emotion Recognition *Sept 2024 – Dec 2024*

- Designed **CNN and RNN (LSTM)** models for Music Emotion Recognition, achieving **76.22%** accuracy with RNNs on **Arousal-Valence Predictions**, demonstrating the advantage of RNNs in handling sequential data.
- Implemented **MFCCs** for feature extraction and fine-tuned neural network architectures for optimal performance on the DEAM dataset.
- Demonstrated model efficacy in predicting music-driven emotional responses, supporting use cases in therapy and mental health.

YOLOv5-Powered X-Ray Baggage Screening for Threat Detection in Airports *Sept 2024 – Dec 2024*

- Created a custom YOLOv5 model using transfer learning with **CSPDarknet53**, fine-tuned on the OPIXray dataset to detect and classify suspicious items in airport baggage scans.
- Boosted precision **(90.35%)** and recall **(87.16%)** by resolving class-specific performance issues using dataset augmentation, dynamic resizing, and anchor box optimization.

Unhealthy Liver Detection using CNN with IoT *Feb 2023 – Jun 2023*

- Presented a **CNN-based method for liver disease detection using CT images** at the **2023 IEEE ICSCSS in Coimbatore, India**, demonstrating the model's **potential for early liver disease diagnosis**.
- Applied advanced **image processing techniques** such as **augmentation, enhancement, and restoration** to improve **model training and dataset variability**, achieving a **30% increase in accuracy** and an **86.8% detection rate**.