Gokul Gandhikumar

(619) 953-8221 • gokulg232003@gmail.com • [gokul2.vercel.app↗](gokul2.vercel.app) • [linkedin.com/in/gokulg02↗](linkedin.com/in/gokulg02) • [github.com/gokulg02↗](github.com/gokulg02)

Machine Learning and Data Science Professional with expertise in LLMs, computer vision, generative AI, and reinforcement learning. Experienced in building end-to-end scalable data & ML pipelines on AWS/Azure cloud, and software engineering.

EDUCATION

University of California San Diego, CA, USA   Sept 2024 - Mar 2026 (Expected)
Master of Science, Machine Learning and Data Science
Coursework: Probability & Statistics, Software Engineering, Statistical Learning, Optimization of Deep Learning Algorithms, Machine Learning for Physical Applications, Data Management for Analytics, Generative AI, LLMs for Medicine, Recommender Systems and Web Mining

Anna University, Madras Institute of Technology Campus, Chennai, India   Oct 2020 - May 2024
Bachelor of Engineering , Electronics and Communication Engineering
Honors: P. M. S. Iyer Memorial Prize for scoring highest grades in freshman year and sophomore year

TECHNICAL SKILLS

Programming Languages: Python, C/C++, MATLAB, SQL, JavaScript, TypeScript
ML Libraries: PyTorch, TensorFlow, NumPy, Pandas, Scikit-learn, Matplotlib, OpenAI APIs, LangChain, OpenAI Gym, OpenCV
Web Development: React, Streamlit, Flask, FastAPI, SQL DB, AWS Amplify, AWS Lambda, Azure Functions
MLOps & DevOps: Azure cloud, AWS cloud, chromaDB, Flask, Docker, Kubernetes, REST API, Git, CI/CD, Agile

WORK EXPERIENCE

AquaMesh.AI, San Diego: Machine Learning Engineer Intern   Aug 2025 – Present
- Conducted 10+ interviews with potential customers to understand user requirements of AI component of product.
- Built and trained models for time-series forecasting of water quality metrics with 22% MAPE score using AWS SageMaker.
- Deployed forecasting models as API endpoints and integrated predictions into a React dashboard on AWS Amplify.
- Designed an agentic AI system leveraging LLMs via AWS Bedrock to analyze water quality trends and deliver insights.
- Developing computer vision algorithms to automatically detect obstructions on remote IoT spectroscopy sensor lenses.
- Implementing an end-to-end cloud native pipeline on AWS that integrates data collection from edge device cameras with image processing APIs to proactively monitor sensor lens cleanliness and send alerts to users.

University of California San Diego, USA: Graduate Student Researcher   Feb 2025 – Present
- Currently simulating a xArm6 robot with control delays in IsaacLab and training delay compensating neural operators.
- Designed Reinforcement Learning (RL) controllers to reduce freeway congestion by optimizing traffic flow modeled with PDEs, achieving a 20% reduction in response time compared to traditional PDE backstepping controllers.
- Built a simulation environment in PDEContRoLGym library for training and validating RL models. ([Repo↗](#) | [Docs↗](#))

PROJECT EXPERIENCE ([Click here to view list of all projects↗](#))

Azure Cloud-Native Platform for ML based Intoxication Detection and Monitoring ([Repo↗](#))   July 2025 - Aug 2025
- Built scalable Azure pipeline for real-time intoxication detection by processing live accelerometer data from IoT devices.
- Designed ETL pipeline to extract time-series features and trained a 83 % accurate random forest classifier using Azure ML.
- Engineered workflow using Azure IoT Hub for data ingestion, Functions to run ML model & SQL database to store results.
- Developed a web dashboard using React and Flask, deployed on an Azure VM to monitor real-time user intoxication.

SnapChef: Recipe Suggestion RAG Bot ([Repo↗](#) | [Demo↗](#))   May 2025 - June 2025
- Designed a RAG chatbot to suggest recipes tailored to user preferences and available ingredients.
- Built a vector database with ChromaDB for efficient recipe retrieval and deployed the service using Flask on Azure cloud.
- Leveraged LangChain and OpenAI LLM APIs to implement chain-of-thought prompting for generating personalized recipes based on users' preferences, dietary restrictions, available ingredients, and desired serving size.

GuidedFace: Face Image Generation based on Prompt and Facial Landmarks Image ([Repo↗](#))   Apr 2025 - June 2025
- Retrained text-to-image Stable Diffusion (SD) model based on ControlNet architecture to act as text+image-to-image model that generates new face images that follows the facial structure of given input conditioning face image as well text prompts.
- Achieved 99% structural similarity to input conditioning images, with FID (31) & IS (3.6) scores comparable to baseline SD.

Interaction-Aware Motion Prediction for Self-Driving (Repo ↗)   Apr 2025 - June 2025
- Developed an interaction-aware motion prediction model that uses transformers to predict other vehicles' reactions to the autonomous vehicle's planned actions and using it to further improvise the autonomous vehicle's planned trajectory.
- Successfully performed left turns, merging, and overtaking maneuvers with a 97% success rate in testing simulations.

Watermarking of Quantized Diffusion Models (Repo ↗)   Feb 2025 - Mar 2025
- Designed a watermarking algorithm to protect & authenticate ownership of 4-bit quantized Flux text-to-image model.
- Proposed dynamic watermarking algorithm remained robust to various watermark removal attacks with 99% watermark preservation rate while preserving model performance of the baseline Flux model.

Load Balancing in 5G networks using Reinforcement Learning (Publication ↗ | Repo ↗)   Aug 2023 - May 2024
- Implemented Q-learning & Deep Q-learning algorithms for optimal user association with base stations in 5G networks.
- Developed a real-time mobile network simulation in Python and implemented RL models in PyTorch.
- Increased network data rates by 175% while demonstrating robustness to network fluctuations & user mobility.
- Work published in the Journal of Supercomputing.

Driver Fatigue Detection using Computer Vision (Repo ↗)   Aug 2023
- Developed a real-time driver fatigue detection system using facial feature tracking and computer vision.
- Built an interactive web dashboard with Flask backend to monitor and log fatigue instances on ThingSpeak cloud.
- Secured 2nd place (top 5%) in Caterpillar's CODE-A-THON 2024 among 45+ teams.

PUBLICATIONS

1. Ramesh, P., Bhuvaneswari, P.T.V., Dhanushree, V.S., Gokul, G. and Sahana, S., 2025. **User association-based load balancing using reinforcement learning in 5G heterogeneous networks**. *The Journal of Supercomputing*, 81(1), p.328.