GOKUL GANDHIKUMAR

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EDUCATION

University of California San Diego, CA, USA Sept 2024 - Dec 2025
Master of Science, Machine Learning and Data Science
Coursework: Probability & Statistics, Software Engineering Principles, Statistical Learning, Optimization of Deep Learning Algorithms, Machine Learning for Physical Applications, Data Management for Analytics, Generative AI

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
ML Libraries: PyTorch, TensorFlow, NumPy, Pandas, Scikit-learn, OpenAI APIs , LangChain, OpenAI Gym , StableBaseline
Tools & Methodologies: Azure Cloud, chromaDB, Flask, Streamlit, Docker, Kubernetes, Git, CI/CD, Agile, DevOps

EXPERIENCE

University of California San Diego, USA: Summer Researcher Feb 2025 – Present

- Developing algorithms for dynamic temperature tuning in large language models (LLMs) to enhance response quality.
- Designed Reinforcement Learning (RL) controllers to reduce freeway congestion by optimizing traffic flow modeled by PDEs and demonstrated improved performance over traditional PDE backstepping controllers. (Repo | Docs)

PROJECTS

SnapChef: Recipe Suggestion RAG Bot (Repo) May 2025 - June 2025

- Designed a RAG system 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 with OpenAI APIs to enable chain-of-thought prompting to generate personalized recipes based on user's servings and dietary requirements.

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 generate 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/IS 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.
- Proposed algorithm performed maneuvers like left turn, merging, and overtaking safely in 97% of the testing simulations.

Load Balancing in 5G networks using Reinforcement Learning (Publication | Repo) Aug 2023 - May 2024

- Designed 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 UE environment & mobility fluctuations.
- 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 Flask-based web dashboard to monitor and log fatigue instances on ThingSpeak cloud.
- Secured 2nd place (top 5%) in Caterpillar's CODE-A-THON 2024 among 45+ teams.

Drunk or Sober Prediction from Accelerometer Data (Repo) Feb 2023 - May 2023

- Developed a ML-based system to classify alcohol intoxication levels by analyzing motion patterns of a person from smartphone accelerometer data.
- Achieved 83% prediction accuracy by training a random forest classifier to make prediction from time and frequency domain features extracted from accelerometer data.