

# AYUSH RANJAN

☎ (831)266-5973 ✉ [aranjan1@ucsc.edu](mailto:aranjan1@ucsc.edu) 💻 [ayuranjan](#) 🌐 [Website](#) 🔄 [ayuranjan](#)

## Education

*University of California, Santa Cruz - Master of Science in Computer Science -CGPA : 3.88/4* *Sep 2023 – Present*  
*Manipal University, Jaipur - BTech in Information Technology* *July 2017 – May 2021*

## Technical Skills

**Programming Languages and Frameworks:** Java, Python, TensorFlow, PyTorch, Keras, Scikit-learn, Hugging Face, LangChain, LangSmith, LangGraph, Pandas, Numpy, SQL, C, Flask, Spring Boot, JUnit, JDBC, React, Redux, JavaScript, HTML, Hibernate, MySQL, PostgreSQL, DB2, MongoDB, pgvector, vector databases  
**Software Development Tools:** GitHub, Docker, Kubernetes, Jenkins (CI/CD), Jira, Google Cloud Platform, Google Colab, VSCode, TensorFlow Extended (TFX), Eclipse, Vim, Azure, Version Control, Confluence  
**Selected Coursework:** Advanced Data Structure, Data Science, Analysis of Algorithms, Design and Implementation of Database Systems, Advanced Machine Learning Techniques, Operating Systems, Advanced Computer Network, Advanced Computer Vision

## Awards and Certifications

**UCSC Kaggle's Competition Winner(2023):** Achieved **first place** in the final project competition of "Applied Machine Learning: Deep Learning" course with a final score of **88.4%** using **Vision Transformers**, ultimately earning an **A+ grade**.  
**3rd Place at Innocircle 2022, Mercedes' Internal Innovation forum:** Implemented **micro frontend architecture** to complement the existing process, enabling users to autonomously modify their vehicle network topology and review changes independently, **eliminating previous dependencies as well as saving more than 50% of the time**.  
**SQL Fundamentals by SoloLearn:** A Program for Mastering SQL Scripting, Database Querying, and Manipulation.

## Experience

**University of California, Santa Cruz** *Santa Cruz, CA*  
*AI Research Assistant & Teaching Assistant* *July 2021 – Aug 2023*

- **AI Research Assistant** (July 2024 – Present)
  - \* Conducting research under the supervision of Professor Yi Zhang focusing on advancing AI capabilities in **agent capacity, agentic workflows, and web agents**.
  - \* Exploring how these AI tools can autonomously improve task completion.
- **Teaching Assistant** (Jan 2024 – June 2024)
  - \* CSE-115A **Introduction to Software Engineering** - Mentored student groups in software projects with an Agile focus.
  - \* CSE-182 **Introduction to Database Management Systems** - Facilitating database application development projects and conducting labs and discussions on relational and non-relational data models, SQL, and database access using Python.

**Capgemini Technology Services India Limited** *Mumbai, India*  
*Associate Consultant & Senior Analyst / Senior Software Engineer* *July 2021 – Aug 2023*

- **Associate Consultant** (Oct 2022 – Aug 2023)
  - \* **Role: Java Developer Client: Mercedes-Benz Research and Development India**
  - \* Designed, implemented, and maintained Java features, employing design patterns while performing code reviews.
  - \* **Headed the Data Model and Diagnostic Team**, demonstrating cross-functional leadership skills.
  - \* Restructured export test cases via XML file import strategy and sorting, **cutting export testing time by 40%**.
- **Senior Analyst / Senior Software Engineer** (July 2021 – Sep 2022)
  - \* **Role: Java Developer Client: Mercedes-Benz Research and Development India**
  - \* Conducted software analysis, programming, testing, and debugging within a project that utilized a **3-tier architecture**.
  - \* Collaborated closely with the **data modeling** team to enhance the functionality and adaptability of XDIS (Cross-platform Data Information System), a critical tool for vehicle diagnostics and automatic driving scenarios in Mercedes.
  - \* Dramatically optimized **XML** file migration time by an impressive **66.67%**. Additionally, enhanced the tool's robustness by concurrently implementing indexing strategies for associated **IBM Db2** database tables.

## Selected Projects

**Enhancing Image Captioning** | *Pytorch, Python Github* *Jan 2024 - March 2024*

- Developed and implemented a baseline **LSTM** model with **ResNet50** for feature extraction using an **encoder-decoder architecture**. Integrated **attention mechanisms** to significantly enhance model performance with minimal training epochs.
- Conducted extensive experiments, including custom data splits and benchmarks, evaluated using **BLEU metrics**. Addressed irregular validation loss, explored learning rate schedules, and compared results with existing implementations.
- Completed this project as part of my Advanced Computer Vision course, securing an **A+ grade**.

**Unveiling Glitches in CLIP** | *Hugging Face, Python, pgVector, ChatGpt Api Arxiv Link* *Jan 2024 - March 2024*

- Conducted in-depth analysis of CLIP model's image comprehension capabilities. Identified and documented **14 systemic faults**, including **4 novel faults**, impacting CLIP's interpretation of images using **2 novel methodologies**.
- Implemented the Discrepancy Analysis Framework (**DAF**) to analyze discrepancies in image similarity rankings between CLIP and **DINOv2** and utilized **ChatGPT** to systematically find these failures. Utilized the Transformative Caption Analysis for CLIP (**TCAC**) approach to evaluate CLIP's response to transformations applied to images.
- Achieved **A+ grade** in CSE 290D Neural Computation at UCSC for this project.

**Video to Mp3 Converter** | *Flask, Docker, Kubernetes, RabbitMQ, MongoDB Github* *Dec 2023*

- Developed a **microservices**-based system with four services, including an authentication gateway, authorization service, video upload service, and converter service. The gateway authenticates users via an authorization service, generating **JWT tokens** for valid users, enabling secure video uploads. Video-to-MP3 conversion was facilitated using the Python library "moviepy".
- Employed asynchronous communication using **RabbitMQ** queue, Utilized **Docker** for containerization, **Kubernetes** for orchestration, and **Minikube** for local development, ensuring consistent and scalable deployment across environments.