# ROHIT KUMAR SALLA

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## EDUCATIONAL QUALIFICATION:

**B.Tech in Computer Science with Specialization in Big Data Analytics**      **GPA**: 8.3     2021 – 2025
**SRM Institute of Science and Technology,** Chennai, Tamil Nadu, India.

## EXPERIENCE:

### Indian Institute of Science (IISc) - **Artificial Intelligence and Robotics Laboratory**

### Computer Vision Intern | March 2025 – Present

- Developed and optimized perception algorithms for autonomous ground vehicles (AGVs) using LiDAR, cameras, and radar.
- Worked on object detection, segmentation, tracking, and 3D reconstruction to enhance AGV perception.
- Implemented sensor fusion techniques for improved environmental understanding.
- Optimized vision-based deep learning models for real-time deployment on embedded systems.
- Collaborated with researchers to integrate perception modules into the AGV's autonomy stack.
- Utilized PyTorch, TensorFlow, OpenCV, Open3D, and ROS for vision-based AI applications.

### National  Chung Cheng University,Taiwan
### Research Intern  | December 2024 - March 2025

- **Advisor : Dr.Chih-Yi Chiu**
- Developed a **Diversity-Aware Recommendation System** (Image + Text) under **TEEP@AsiaPlusProgram**.
- Integrated **ViT** for image and **BERT** for text feature extraction, enhancing multi-modal recommendations.
- Utilized **FAISS** for fast similarity retrieval and implemented **diversity & fairness metrics** to improve recommendation quality.
- Applied **re-ranking techniques** to ensure diverse, novel, and unbiased food item suggestions.
- Supervised by **Dr. Chih-Yi Chiu** and worked with **Python, PyTorch, Scikit-learn**.
- **Challenges Overcome**: Addressed data alignment issues between image and text features, and fine-tuned model parameters for optimal diversity in recommendations.

### Carnegie Mellon University
### Research Intern  | March,2024 - June,2024
**Title** : Automated Analysis of In Situ Cryo-Electron Tomography Data
**Advisor : Dr. Xiangrui 'Taylor' Zeng**

- **Objective:** Developed unsupervised and weakly supervised methods to automate the analysis of in situ cryo-electron tomography data, enhancing the detection and recovery of macromolecular structures.
- **Methodology:**
  - Implemented an end-to-end robust framework for joint unsupervised image alignment and clustering, as detailed in the paper *"End-to-end robust joint unsupervised image alignment and clustering."*
  - Addressed challenges in noisy cryo-ET data by aligning images and clustering similar structural features without extensive manual intervention.
- **Impact:**
  - Enabled efficient, automated processing of cryo-ET data, facilitating deeper insights into macromolecular structures.

**Taiwan - India Big Data Analytics Lab, SRM University**

**Research Intern | August 2023 - September 2024**

- Researched techniques like **"LLM Patent Retrieval," "PatentGPT,"** and **"DeepPatent2"** to improve patent retrieval by linking drawings with abstracts for better contextual understanding.
- Implemented a **CLIP-based multimodal retrieval system** combining text and image data to optimize **precision** and **scalability**.

Achieved best results by:

- **Fusing text and images** for richer context and improved retrieval accuracy.
- **Optimizing precision and speed** for large-scale patent search efficiency.
- **Incorporating novelty and fairness metrics** to ensure unbiased, relevant results

**Unify AI**
**Research Intern | June 2023 - March 2024**

**Project Title– Discover Routing**

- Led a project optimizing **Large Language Model (LLM) selection** for specific tasks, balancing **speed**, **quality**, and **cost-efficiency**.
- Explored and implemented strategies to enhance **deployment efficiency**, contributing to the project's success in securing **$8M in funding**.
- Collaborated with **cross-functional teams** to evaluate and integrate **cutting-edge LLM technologies**, ensuring alignment with business objectives and driving project success.

## CrossGL
## Machine Learning Intern |  September 2024- November 2024

- Collaborated with a team of engineers and researchers to advance the capabilities of Dyson, CrossGL's AI platform for hardware optimization.
- Developed machine learning models to enhance hardware optimization and efficiency for CrossGL's AI platform.
- Implemented innovative solutions to improve the performance and accuracy of machine learning algorithms for hardware optimization at CrossGL.

**PROJECTS:**

**NeuroEvolution Agent for Neural Slime Volleyball**

- **From-Scratch NEAT:** Developed a NEAT algorithm using NUMPY/JAX, evolving network structure through mutation, crossover, speciation, and selection.
- **Adaptive Network Design:** Engineered a feed-forward neural network that dynamically adjusts weights for optimal gameplay.
- **Robust Training:** Trained via internal AI challenges and self-play to ensure adaptive strategy refinement.
- **Best Result:** Achieved an agent that consistently outperformed the baseline AI, demonstrating superior real-time decision-making and high win rates in competitive matches.

**Backprop NEAT with Increased Network Complexity**

- **Hybrid Algorithm Development:** Integrated NEAT with backpropagation using JAX, enabling simultaneous evolution of network architectures and weight training.
- **Versatile Dataset Testing:** Validated on three 2D classification tasks (XOR, Circle, Spiral), demonstrating robust performance across diverse data distributions.
- **Dynamic Network Enhancement:** Employed advanced mutation operators to incrementally add nodes and connections, increasing network complexity while effectively managing overfitting.
- **Efficient Implementation:** Leveraged JAX for high-performance numerical computing, facilitating rapid experimentation and prototyping of evolving neural architectures.
- **Comprehensive Evaluation:** Documented improved decision boundaries and enhanced classification accuracy across various datasets.
- **Best Result:** Achieved perfect classification on the XOR dataset and notable performance gains on the Circle and Spiral tasks, illustrating the evolved networks' optimal balance between complexity and predictive accuracy.

**Ancient Egyptian Hieroglyph Generation using Stable Diffusion**

- Fine-tuned CompVis/stable-diffusion-v1-4 with LoRA (targeting U-Net attention layers) and the CLIP tokenizer to map modern English prompts to historical hieroglyph aesthetics.
- Curated and standardized a dataset from historical repositories paired with English definitions for consistent training.
- Trained using AdamW and MSE loss over 5 epochs, achieving optimal convergence.
- **Best Result:** Generated hieroglyphs with exceptional visual fidelity and cultural authenticity, highly rated in qualitative evaluations.

**Multiagent Debate for Enhanced Visual Reasoning**

- **Innovative Framework:** Adapted the multiagent debate strategy for vision models to improve factual accuracy and reasoning in visual tasks.The Idea is inspired by the paper "*Improving Factuality and Reasoning in Language Models through Multiagent Debate*"
- **Ensemble of Vision Models:** Deployed multiple instances of state-of-the-art vision models (e.g., Vision Transformers/CLIP) to debate image interpretations.
- **Iterative Refinement:** Designed a multi-round debate protocol that aggregates diverse perspectives to converge on the most consistent and accurate visual prediction.
- **Robust Evaluation:** Validated the approach on visual reasoning datasets (e.g., VQA/GQA), achieving significant improvements over single-agent baselines.
- **Best Result:** Delivered enhanced visual reasoning and factual consistency, outperforming standard models by a substantial margin.

**ACTIVITIES AND AWARDS:**

- Qualified for Round 2 of Google Code Jam (2022).
- Selected for Summer School on AI conducted by IIIT Hyderabad in 2024.
- GOA Institute of Management - Advanced to Round 2 at National Level Hackathon-Secured top 8% performance in Big Data Analytics in 2024