Ruchirinkil Marreddy

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Professional Summary

ML Research Engineer with experience building reliable experimentation and model evaluation pipelines in Python and PyTorch for modern neural networks. Experienced in studying training dynamics, stability, and generalization, with strong skills in debugging, automation, and reproducible research workflows. Seeking research engineering and applied ML roles.

Education

Purdue University, West Lafayette, IN **August 2023 - May 2026**
Masters in Electrical and Computer Engineering, Thesis GPA: 3.63/4.0
Coursework: Artificial Intelligence, Deep Learning, Reinforcement Learning, Quantum Machine Learning, Computational Methods and Optimization

Indian Institute of Technology , Palakkad **July 2018 - June 2022**
Bachelor of Technology (Honors), Electrical Engineering GPA: 8.78/10

Experience

Purdue University Graduate Researcher - Machine Learning & AI **Aug 2023 – Present**

- Led **PyTorch**-based experiments to study training dynamics and generalization across ViTs, CNNs, and GPT-style models, generating insights into **optimization behavior** in modern neural networks.
- Built custom analysis pipelines using **Functorch** to track **module-level behavior** (e.g., attention vs. MLP blocks), and guide optimizer and hyper-parameter choices
- Designed evaluation metrics to assess **training stability and inductive bias**, enabling **more reliable training runs** and clearer cross-architecture comparisons

Purdue University Graduate Teaching Assistant

MFET16300: Graphical Communication & Spatial Analysis: Prof. Travis Fuerst **Jan 2025 - May 2026**

- Supported lab sessions and provided individual feedback on AutoCAD assignments, helping students improve spatial reasoning and technical drawing accuracy

ECE31033: Power Electronics: Prof. Steven D Pekarek **Jan 2024 - May 2024**

- Assisted students in understanding key concepts in switching circuits , and power conversion

Zoom Video Communications Service Engineer **July 2022 - July 2023**

- Analyzed and resolved real-time production ML issues across Zoom product pipelines using **ELK Stack**, **Kibana**, and **MySQL**
- Collaborated with research, development, and operations teams in design internal automation tools using **Python, C, HTML, JavaScript, Git**, achieving a **65% reduction in issue resolution time** and significantly improving satisfaction among premium enterprise clients

UST Global Data Science Intern **June 2021 - July 2021**

- Designed and developed an interface integrating **OpenCV** and machine learning techniques to automatically generate electricity meter bills from uploaded digital meter images, achieving **100% automation** and reducing manual processing time by **70%**, with the application rated as highly user-friendly by mentors and peers

Research Outputs

- WiE 5th Annual Symposium (Purdue) - Presenter, Feb 9-10, 2026
- "Label-NTK Alignments and A Tighter Convergence Bound in the NTK Regime." Ruchirinkil Marreddy and Chaoyue Liu. *arXiv preprint*, 2026. [Paper]

Projects

Text-to-image generation via transformers **Aug 2024 - Dec 2024**

- Developed a text-to-image generation model, inspired by **CogView**, using **Python, Pytorch** to build a custom VQVAE Auto encoder and transformer model trained on the MS COCO dataset, incorporating techniques like PB Relax and Sandwich Layer Normalization to stabilize training

Quantum Diffusion Denoising Probabilistic Model (QuDDPM) **Aug 2024 - Dec 2024**

- Re-implemented the QuDDPM using **Qiskit** and **Python**, leveraging low-depth quantum circuits and evaluating performance with Maximum Mean Discrepancy (MMD) loss

Notebooks for Agents: An External Memory for Reinforcement Learning **Aug 2024 – Dec 2024**

- Developed a Notebook external memory structure for reinforcement learning using **Python**, **Gymnasium**, and **Stable-Baselines3**, increasing rewards by **14.5%** and reducing task completion time by **65.5%** in partially observable environments

Technical Skills

Programming & Tools: Python, C, MySQL, Git, Linux, CVX, HTML, JavaScript, MATLAB, Verilog
MachineLearning & DL: Pytorch, FuncTorch, OpenCV, Hugging face transformer, Numpy, Pandas, Scikit-learn
Research & Modeling Tools: Qiskit, Gymnasium, Stable-baseline3, ELK Stack, Kibana