Pranav Mishra

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Skills

TECHNICAL SKILLS: Python, C++, JavaScript, Java, TensorFlow, PyTorch, MatLab, Pandas, LangChain, React, NumPy, Node.js, Flask, Rust, Django, FastAPI, PostgreSQL, MongoDB, Docker, Git, GCP, Azure, AWS, DevOps, REST APIs

APPLICATIONS: Machine Learning, Deep Learning, NLP, Computer Vision, Neural Networks, Transformers, Generative Models, MLOps, Cloud Computing, Agile Development, Linux, Fine tuning, Data structures, Version Control

Technical Experience

UIC: V-ARE Labs | Research Software Engineer ***Feb 2024 - Present***

- Built virtual patient system using Unreal Engine and C++. Deployed REST APIs with Python backend for data analysis ↗
- Integrated LangChain & PostgreSQL database to build a full-stack virtual avatar platform on Azure, enabling users to create custom RAG systems with one-click deployment using React/JavaScript frontend and Cosmos DB backend. ↗

Bipolar Factory | Software Developer Intern ***March 2023 - May 2023***

- Developed data-driven streaming platform using MERN stack (MongoDB, Express.js, React, Node.js) with TypeScript. Established AWS cloud deployment pipeline following Agile methods, Jenkins CI/CD and Linux server management.
- Built in-game chat feature using C#, Unity(10% retention increase), MongoDB & SQL optimization in Metawood ↗ .

Projects

Big5-Agents: Enhancing Medical Decision-Making of LLMs Through Structured Teamwork ***GitHub***

- Developed systematic multi-agent collaboration framework in Python translating organizational teamwork principles into LLM-based medical reasoning systems with dynamic agent recruitment algorithms, and Azure cloud deployment.
- Achieved superior performance across 7/8 medical datasets through systematic ablation studies. [AAAI 26 submission]

SnakeAI-MLOps: Multi-Agent Reinforcement Learning Snake Game ***GitHub | Demo***

- Built C++ game with SFML and LibTorch, implementing MLOps pipeline with 4 RL algorithms, model comparison tools, and CI/CD deployment with Docker containerization achieving 5x training speedup through CUDA optimization.

Automating Prompt Generation for Training-Free Object Segmentation in PaintSeg ***GitHub***

- Developed autoprompting system leveraging computer vision techniques with diffusion models and Dense Prediction Transformer fine-tuning, PostgreSQL database for automated data annotation.
- Achieved 5.5% intervention in IOU score, deploying MLOps pipeline with Kubernetes orchestration.

MetaRAG: Enhancing Document Retrieval with LLM-Driven Metadata Enrichment ***GitHub***

- Architected end-to-end production-grade RAG system using LangChain, Pinecone, and Azure cloud services
- Delivered 92.5% precision and 25% hallucination reduction through hybrid search algorithms & custom retrievers, deploying scalable Linux infrastructure with Kubernetes & automated data backup systems. [NeurIPS 2025 Submission]

Reproduced InBedder Text Embedding: Answer is All You Need ***GitHub***

- Reproduced ACL research implementing Inbedder text embedders using TensorFlow and PyTorch for NLP applications.
- Evaluated performance across 7 benchmark datasets through machine learning classification and clustering, implementing ETL pipelines using Node.js backend and MongoDB database for scalable inference deployment.

Education

Master of Science, Computer Science [Graduate Assistant] ***Aug 2023 - May 2025***
University of Illinois at Chicago, Illinois, USA GPA: 3.6/4.0

Bachelor of Science, Computer Science and Engineering ***Aug 2019 - June 2023***
Dayananda Sagar College of Engineering, Bangalore, Karnataka, India GPA: 4.0/4.0

Extracurricular

Winner of MIT XR Hackathon | Built Meta Quest 3 app using Unity and Hugging Face for spatial data visualization ↗

INFORMS Analytics+ Presented MetaRAG research to 700+ professionals | First place HINT 5.0 Web3 virtual museum ↗

Explore my portfolio for 25+ innovative projects spanning game design, AI/ML research, and in-development work ↗