Vineeth Bhat

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Education

IIIT Hyderabad	**Sep 2021 – May 2025**

B.Tech. (Honours) in Computer Science and Engineering   *Hyderabad, India.*
CGPA - 9.79/10.0 (Dean's List I – Top 5% of batch)

Experience

Undergraduate Researcher	**Sep 2023 – Present**

AI Alignment & Robotics Research   *Hyderabad, India*

− **Robotics:** Working under Prof. K. Madhava Krishna, leveraging computer vision and foundation models to solve robotics tasks. Implemented the majority of the codebase for a project that resulted in a submission to IEEE ICRA (Core A*, arXiv:2409.12002).
Currently working on trying to learn vision based navigation controllers using topological, semantic graphs by using the graph to give the controllers an understanding of intermediate goals to achieve performance similar to SOTA through a more interpretable system.

− **AI Alignment:** Contributed to a project on developing consistency metrics to judge whether an LLM's internal world model adheres to probability laws as a SPAR Mentee; Created pipelines for generating ground truth prediction questions datasets and correlated our metrics with Brier scores with the aim of seeing whether probability based consistency serves as a proxy for accuracy. Submitted to ICLR (Core A*, ArXiv:2412.18544) .

Intern - D.E. Shaw and Co.	**May 2024 – June 2024**

Front Office (R&D) Tech Group   *Bangalore, India*

− Streamlined high-throughput data applications using Java, Kafka, and Python, boosting testing and debugging efficiency by nearly 2x and enabling faster integration into newer trading systems.

− Engineered one-step local deployment modules, eliminating the need for hours-long remote debugging procedures and accelerated deployment pipelines, reducing initialization from minutes to a single step for three critical applications.

Teaching Assistant	**Aug 2023 – Feb 2024**

Operating Systems & Networks, Computer Graphics   *Hyderabad, India*

− Created assignments and graded exams; designed the final project for OS & Networks – Creating an NFS from scratch.

Selected Projects

Software Engineering Projects | GitHub | Architecture, Design Patterns, OOPs, Java

− Refactored a book management system by integrating design patterns; significantly enhanced code maintainability and improved user experience through a more intuitive interface and streamlined functionality. Automated GitHub workflow to periodically scan for design smells, leverage LLMs for refactoring, and auto-generate pull requests.

− Developed an ML application, *"ModelHub"*, for model training, testing, and logging, comparing microservices and monolithic architectures. Followed IEEE 42010 standards for architectural decisions and factored in rolling user feedback.

Flip Flops in Neural Modeling, a.k.a., FFN | Report | Neural Network Architectures, Cognitive Modeling, PyTorch

− Conducted comparative analyses against LSTM, GRU, and RNN models, demonstrating FFN's superior memory coherence and resistance to interference in cognitive tasks such as signal generation and sentiment analysis.

− Explored biologically inspired learning rules like Hebbian learning and STDP, integrating them into FFN to analyze adaptability and memory dynamics, with visualizations of internal mechanisms for deeper insights.

Re-imagining the Google File System (GFS) | GitHub | Distributed Systems, Go, Scalability

− Implemented the GFS from scratch in Go with exactly-once record-append semantics and benchmarked to show almost linear throughput-latency scaling under high concurrency, handling system failures across multiple dimensions.

− Engineered a primary-secondary replication model with dynamic recovery mechanisms, including re-replication, stale replica resolution, and automated garbage collection for fault tolerance and high availability.

Enhanced xv6 Operating System | GitHub | C, Systems Programming, Operating Systems, Performance Optimization

− Integrated and tested multiple CPU scheduling algorithms, including FCFS, PBS and and Multilevel Feedback Queue (MLFQ), to optimize CPU utilization, reduce wait times, and adapt to various process behaviors and workload demands.

− Added copy-on-write (COW) to delay memory duplication, reducing overhead and improving process creation efficiency.

Technical Skills

Languages: Python, Java, C++, SQL, Bash
Technologies: PyTorch, Apache Kafka, Docker, Git, Unix, HPC, ROS
Areas of Expertise: Software Engineering, Machine Learning, Computer Vision, Probability and Statistics

Achievements and Extracurricular

Contributing – Developed an NLP-powered grading web-app with RCTS for aiding teachers (used Agile SDLC)
Tech Team Head – Headed the Tech Team at E-Cell, IIIT-H from September 2023 to April 2024
Content Writing Head (Felicity) – Co-headed the team during our college fest in 2024
Competitive Programming – CodeForces Profile – vineeth.bhat
AIR 610 in JEE Main 2021 – Ranked 610th among 9,39,000 candidates (Top 0.05%) in the examination
AIR 877 in JEE Advanced 2021 – Ranked 877th among 1,41,000 candidates (Top 0.6%) in the examination