Prakhar Dixit

Research Intern

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SUMMARY

PhD student in Computer Science at UMBC specializing in Machine Learning, Reinforcement Learning, and Mathematical Reasoning in LLMs.Research focuses on enhancing reasoning in LLMs, improving RL sample efficiency, and developing Sim2Real frameworks, with contributions in graph attention mechanisms, human feedback integration, and YOLO-based Sim2Real techniques, achieving significant improvements in efficiency and decision quality.

EXPERIENCE

Summer Research Intern May '25 — Oct '25
Emergence AI New York City, United States

- Worked with a long-term memory system for conversational agents.
- Achieved state-of-the-art (SOTA) results on the **LongMemEval** benchmark with an accuracy of **86**%, surpassing the best SOTA by **15%**
- Developed specialised agents for diverse enterprise tasks, particularly in planning and self-improvement.

Graduate Research Assistant Jan '22 — Present
University of Maryland Baltimore County Baltimore, United States

- Currently working on enhancing mathematical reasoning capabilities in large language models through human-driven learning techniques.
- Designed a Sim2Real framework, training RL algorithms with YOLO object detectors in simulation, achieving an 85% transfer success to real-world robots.
- Enhanced navigation efficiency of low-powered nano drones by 30% using Hierarchical Reinforcement Learning.
- Worked on Reinforcement Learning using Human Feedback(RLHF) technique TAMER (Scalar binary feedback) and showcased how can agents harness the information contained in human-generated signals of reward to learn sequential decision-making tasks.
- Integrated graph attention networks within an R-GCN framework to enhance model-free RL algorithms.
- Achieved a 20% improvement in sample efficiency on Boxworld and Minigrid LavaGap environments, leading to faster learning and better decision quality.

Graduate Assistant Aug '21 — Dec '21
University of Maryland Baltimore County Baltimore, United States

- Assisted in teaching CMSC 691.4 (Introduction to Data Science), contributing to the education of over 50 students by grading assignments and providing feedback, ensuring a 95% assignment completion rate.
- Collaborated with a professor to implement student projects, increasing student engagement and project completion rates by 20%.

Software Engineer Jul '19 — Apr '21
Titan Company Limited Bengaluru, India

- Developed a web application using Spring Boot and REST APIs, enabling over 8,000 employees to efficiently visualize and manage their asset data stored in Oracle DB, resulting in a 40% reduction in data retrieval time.
- Implemented a comprehensive Python dashboard to analyze daily login data, enabling the derivation of actionable insights and significantly improving the accuracy of user engagement tracking by 25%.

Software Engineer Intern Mar '19 — Jun '19
Titan Company Limited Bengaluru, India

- Participated in testing and improving various applications within the software development cycle, enhancing software reliability by 30% and reducing bug occurrences by 20%.
- Tested and managed BPM-related applications, increasing process efficiency by 25% and ensuring seamless workflow integration.

Research Intern Jun '18 — Jul '18
National University of Singapore Singapore

- Examined a Credit card fraud detection dataset achieving an accuracy of **98.5 %** using logistic regression, which outperformed ANN, random forest, decision tree, and Support vector machines (SVM)
- Generated advanced data preprocessing, reducing data redundancy by 25% and model training time by 30%, boosting efficiency.

EDUCATION

PhD in Computer Science, University Of Maryland Baltimore County (GPA: 3.589) Aug '23 — Present
Baltimore, United States

- Working to find out how the math reasoning is so poor in LLMs

MS in Computer Science, University Of Maryland Baltimore County (GPA: 3.5) Aug '21 — May '23
Baltimore, United States

- Thesis - Dynamic Edge Weighting in Relational Graph Convolutional Networks: Enhancing Sample Efficiency via Graph Attention in Reinforcement Learning

B.Tech in Computer Science Engineering, SRM Institute of Science and Technology (GPA: 3.7) Aug '15 — May '19
Chennai, India

- Final Year Project - Neural Sketching

PROJECTS

ScholarAgent Link Feb '25

- An AI Agent that fetches the recent ArXiv research papers based on search, just like Google Scholar but in a more user-friendly and readable way

LLM Detect AI Text Link Jan '24

- Developed a machine learning model that can accurately detect whether an essay was written by a student or an LLM,finishing in the top 25% of leaderboard.

Deep Learning Steering Model Link Aug '17

- Built a self-driving prototype using Convolutional Neural Networks and OpenCV. The system used images and steering angles as labels to determine the correct steering angle for the vehicle.

POSTERS AND PRESENTATIONS

- Presentation @ 3rd WDT Semi Annual Review 2025 held at University of Maryland, Baltimore County
- Poster Presentation at PyCon 2023 Link
- Presentation @ AI and Autonomy for Multi-Agent Systems(ArtiAmas) Annual Review 2022 at University of Maryland College Park Link
- Poster Presentation at PyCon 2024 Link

SKILLS

Programming Python, Java, SQL, JavaScript, C++
Machine Learning Deep Reinforcement Learning(DRL), Logistic Regression, Neural Networks (ANN, CNN), YOLO Object Detection, Sim2Real, Large Language Models(LLMs), Retrieval Augmented Generation(RAG)
Database Management MySQL, Oracle DB, CRUD operations
Software Development Spring Boot, REST APIs, Android Studio, Gradle, MERN stack (MongoDB, Express.js, React, Node.js)

PUBLICATIONS

WildfireVLM: AI-powered Analysis for Early Wildfire Detection and Risk Assessment Using Satellite Imagery Mar '26
IGARSS 2026
Paper Link

SOTA Results in Agentic Memory on LongMemEval Jul '25
Emergence AI
Blog Link

SBI-RAG: Enhancing Math Word Problem Solving for Students through Schema-Based Instruction and Retrieval Augmented Generation Dec '24
NeurIPS 2024
Paper Link

Dynamic Edge Weighting in Relational Graph Convolutional Networks: Enhancing Sample Efficiency via Graph Attention in Reinforcement Learning Sep '24
University of Maryland, Baltimore County ProQuest Dissertations & Theses
Thesis Link

ReProHRL: Towards Multi-Goal Navigation in the Real World using Hierarchical Agents Feb '23
AAAI 2023
Paper Link

Toward Real-World Implementation of Deep Reinforcement Learning for Vision-Based Autonomous Drone Navigation with Mission Jul '22
RSS 2022
Paper Link

PEER-REVIEWING EXPERIENCE

- Reviewer for Workshop on Mathematical Reasoning and AI MATH-AI @ **NeurIPS'25.**

- Reviewer for **Inductive Biases in Reinforcement Learning Workshop @ Reinforcement Learning Conference 2025(RLC 2025)**
- Reviewed 3 paper for **Association for Computational Linguistics (ACL 2025)**
- Talks and Tutorial Reviewer for **Python Conference(Pycon 2025)**