

ADITYA PARASHAR

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EDUCATION

University of Massachusetts, Amherst

Feb 2023 - Dec 2024

MS, Computer Science

Courses: Advanced NLP, Distributed & Operating Systems, Algorithms for Data Science, Reinforcement Learning, Probabilistic Graphical Models

Indian Institute of Technology(IIT), Guwahati

2014 - 2018

Bachelor of Technology, Mechanical Engineering (Minor in Mathematics)

Courses: Computational Fluid Dynamics, Scientific Computing, Mathematical Statistics

EXPERIENCE

Allen Institute for AI (AI2)

October 2024 - Present

Research Collaborator

Boston, MA

- Designed and implemented an **agent framework** for open-ended exploration of datasets, enabling automated experiment design, tool calling for experiment execution, and hypothesis generation, advancing **data-driven discovery** processes.
- Developed a tree-based exploration algorithm to systematically discover diverse clusters of hypotheses, inducing novelty and diversity into the hypotheses derived from datasets.

Oracle

June - Sept 2024

Research Intern, Machine Learning Research Group, Oracle Labs [under review at a conference]

Boston, MA

- Defined the task of operations research (OR) problem re-formulation and **constructed a benchmark dataset** of 1,946 data points spanning 7 constraint types, designed to evaluate LLMs' handling of formulation changes through what-if questions.
- Conducted an empirical analysis showing Llama 3.1's performance drops by over **44%** as the number of decision variables increases to 30, highlighting limitations in LLMs' counterfactual reasoning and OR-based mathematical reasoning abilities.

Google 📄

Feb - May 2024

Graduate Student Researcher

Amherst, MA

- Implemented **arithmetic sampling**, an embarrassingly parallel strategy for enhancing diversity of **multi-sample inference** from LLMs, achieving a **3-5%** increase in mathematical reasoning task performance.
- Evaluated this in conjunction with self-consistency based decoding for reasoning tasks and with minimum bayes risk (MBR) decoding for machine translation tasks.

UMass BioNLP lab 📄 📄

June 2023 - May 2024

Graduate Research Assistant, Prof. Hong Yu (*accepted at NAACL 2025*)

Amherst, MA

- Engineered a USMLE (United States Medical Licensing Examination) question generation system using a **self-refining** LLM (GPT-3+) framework, generating **758** high-quality questions with an iterative critique and correction feedback loop.
- Introduced the **LLM-as-judge metric** to reduce expert involvement in question quality assessment, streamlining evaluation through 10 key expert-aligned criteria and achieved a **79.8%** win rate compared to GPT-4 baselines in human evaluations.

Language Technology Research Centre, IIIT-Hyderabad 📄

Sept 2022 - Jan 2023

Research Intern, with the guidance of Dr. Sukhada, IIT BHU

Hyderabad, India

- Worked on interlingua-based **machine translation**, involving the development of language-independent Universal Semantics Representation (**USR**) datasets for Hindi and Sanskrit by parsing multilingual data.
- Collaborated with linguists to develop algorithms for USR **graph linearization**, enhancing model (MT5 and BART) performance for sentence generation through **finetuning**.

Agility E Services

July 2018 - Sept 2022

Software Engineer (Technology Specialist)

Hyderabad, India

- Developed a multi-tenant **Integration Platform as a Service (IPaaS)** for automated data sync between cloud and on-premises applications, implementing a Windows service for job scheduling and deployment through a customizable installer.
- Enhanced IPaaS security by implementing role-based access controls and safeguarding Azure services (Service Bus, PostgreSQL, App Services) with Microsoft Sentinel.
- Migrated an inventory purchase and order management web application from a monolithic to a **microservices** architecture, integrating **CI/CD** pipelines for enhanced reliability and scalability.
- Implemented the command and query responsibility segregation (**CQRS**) design pattern within the platform, ensuring better scalability, workload synchronization and management.

TECHNICAL SKILLS

Programming Languages

Python, C#, Java, Typescript, Javascript, SQL, Bash

Deep learning & Data Science

Pytorch, HF Transformers, CUDA, JAX, NumPy, SciPy, Pandas, SLURM (GPUs)

Software Development Frameworks

Angular, .NET Core, RabbitMQ, Microsoft Azure

PROJECTS

Literalizing figurative language using in-context learning 📄 📄

Spring 2023

Adv. NLP course project, with Prof. Mohit Iyyer

- Developed an end-to-end pipeline to generate literal translations for figurative English sentences.
- Labeled the figurative sentence type using a fine-tuned classification model, then leveraged in-context learning (ICL) with example selection for instruction, few-shot and chain-of-thought prompting.