

Akriti Jain

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RESEARCH INTERESTS

My research aims to build language models that people can genuinely rely on by improving their reliability and efficiency. I am particularly interested in uncertainty quantification and how it can enable more controllable and verifiable generation, especially in multi-step reasoning and information-seeking tasks.

EDUCATION

Indian Institute of Technology Roorkee <i>B.Tech in Electrical Engineering (Gold Medalist) Class Rank 1 GPA: 9.348/10.00</i>	Oct 2020 – May 2024 <i>Roorkee, India</i>
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PUBLICATIONS

- [1] **Doc2Chart: Intent-Driven Zero-Shot Chart Generation from Documents** [Link]
Akriti Jain, Pritika Ramu, Aparna Garimella, Apoorv Saxena.
EMNLP 2025 (Main Conference).
- [2] **FiRST: Finetuning Router-Selective Transformers for Input-Adaptive Latency Reduction** [Link]
Akriti Jain*, Saransh Sharma*, Koyel Mukherjee, Soumyabrata Pal.
EMNLP 2025 (Findings).
- [3] **Modeling Contextual Passage Utility for Multihop Question Answering** [Link]
Akriti Jain, Aparna Garimella.
AACL-IJCNLP 2025 (Main Conference).
- [4] **Knowing What's Missing: Assessing Information Sufficiency in Question Answering**
Akriti Jain, Aparna Garimella.
Under review at ACL ARR.
- [5] **MIRAGE: Multi-hop Reasoning with Ambiguity Evaluation for Illusory Queries** [Link]
Jeonghyun Park, Ingeol Baek, Seunghyun Yoon, Haeun Jang, Aparna Garimella, **Akriti Jain**, Nedim Lipka, Hwanhee Lee.
Under review at ICLR 2025.

EXPERIENCE

Research Associate, Multimodal Content Experience Lab, Adobe Research <i>Group: Document Experiences Mentors: Dr. Aparna Garimella, Dr. Koyel Mukherjee</i>	June 2024 – Present <i>Bangalore, India</i>
• Worked on enabling effective information consumption from large document collections by developing methods for factual grounding, assessing the quality and sufficiency of retrieved information, and aligning model outputs with user goals.	
• Developed prompt optimization techniques via token compression (15% reduction) to lower inference cost and achieve a 13.7% latency gain, while preserving answer quality; successfully shipped a multilingual version of this technology into product.	
• Delivered an internal talk on LLM alignment and response calibration, titled: “Are LLMs inherently people-pleasers?”	
• Published 3 papers and successfully filed 4 patents within the first year, with additional manuscripts currently under review.	
Research Intern, Multimodal Content Experience Lab, Adobe Research <i>Topic: Multimodal LLMs for Design Generation and Editing</i>	May 2023 – July 2023 <i>Bangalore, India</i>
• Engineered a compressed JSON format for design templates, reducing token count by 7× while maintaining visual quality.	
• Fine-tuned a LLaMA-based MLLM on design completion using novel BERT-like masking strategies on Adobe Express templates, achieving a 3× IoU improvement on bounding box prediction and enabling text-prompt-based element suggestions.	
• Received a selective Pre-Placement Offer (PPO) for performance, awarded to only two members of the intern cohort.	

SELECTED PROJECTS

Attention-Guided Evidence Selection for Multi-Hop Question Answering <i>Ongoing</i>	<i>Adobe Research</i>
• Developed a framework to identify evidence spans using cross-attention patterns between questions and document chunks and uncovered key interpretability insights into how models aggregate and connect information during multi-hop reasoning.	
• Designed a KL-divergence-based filtering mechanism to detect context insufficiency and trigger external retrieval or web search, and applied neighbor-aware peak detection to isolate high-confidence evidence spans from attention distributions.	
Intent-Driven Zero-Shot Chart Generation from Documents <i>EMNLP 2025</i>	<i>Adobe Research</i>
• Proposed a framework for generating visualizations from unstructured text by interpreting user intent to select relevant data.	
• Designed CHARTEVAL, a novel attribution-based metric evaluating chart accuracy through source-data alignment.	
• Curated a new benchmark dataset of 1,242 <intent, chart, document> tuples from financial and scientific domains.	
Input-Adaptive Layer Skipping for Efficient LLM Inference <i>EMNLP 2025 Findings</i>	<i>Adobe Research</i>
• Developed a lightweight framework for dynamically skipping transformer layers in LLMs, achieving 10–20% latency reduction.	
• Implemented sequence-level routing during prefill, ensuring KV-cache compatibility and eliminating recomputation overhead.	

- Integrated LoRA fine-tuning to compensate for skipping-induced quality loss, maintaining 80–95% of base model performance.

Assessing Information Quality for Robust Question Answering | IJCNLP-AACL 2025

Adobe Research

- Fine-tuned a lightweight model to score passage utility based on inter-passage dependencies for multi-hop QA, leveraging reasoning traces as training signal to improve both reranking and answer generation over relevance-based methods.
- Designed a framework to determine if source content is sufficient to answer a question by identifying information gaps through self-consistency, achieving 12% improvement on inferential QA and over 90% accuracy on faithfulness benchmarks.

Command Recognition from Dysarthric Speech using Quantized DNN | B.Tech Final-Year Project

IIT Roorkee

- Developed a command-recognition system for dysarthric speech by training and fine-tuning a DNN via transfer learning.
- Achieved up to 79.31% for low-intelligibility speakers through speaker-adaptive transfer learning on the UA-Speech dataset.
- Applied quantization (492 KB) for TinyML deployment on Raspberry Pi with I2S MEMS microphone, enabling a portable assistive device for real-time offline inference and command recognition on resource-constrained embedded hardware.

Reinforcement Learning for Stock Trading Applications | Course Project

IIT Roorkee

- Developed and evaluated reinforcement-learning agents designed to learn profitable trading strategies in a simulated market environment using Advantage Actor-Critic (A2C) and Proximal Policy Optimization (PPO) algorithms.
- Utilized OpenAI Gym and the gym-anytrading environment to model market dynamics and validate agent performance.

PATENTS

- [1] Akriti Jain, Pritika Ramu, Aparna Garimella. **Generating Charts from Documents Based on User Intent and Document Data.** [Filed] (US Patent App. P13973-US)
- [2] Akriti Jain, Saransh Sharma, Koyel Mukherjee, Soumyabrata Pal, Aayush Acharya, Saud Iqbal. **Skipping Layers in Large Language Models Utilizing Layer-Specific Routers with Low Rank Adapters.** [Filed] (US Patent App. P13522-US)
- [3] Akriti Jain, Aparna Garimella. **A Method to Assess Information Sufficiency in Question Answering.** [Filed] (US Patent App. P14529-US)
- [4] Akriti Jain, Aparna Garimella. **A Method to Assess the Utility of Retrieved Passages for Multi-hop QA.** [Approved for filing]
- [5] Anish Mulay, Divyansh Verma, Aishani Pandey, Akriti Jain, Pritika Ramu, Aparna Garimella **A Method to Guide User Decisions with Optimal Preference Elicitation from Unstructured Documents.** [Approved for filing]

TEACHING AND MENTORSHIP

Mentor: Adobe Research. Supervised 3 undergraduate interns and collaborated with 1 PhD intern on research projects during summer internship season; co-led university collaborations with University of Maryland and Chung-Ang University.

Undergraduate Teaching Assistant: *Introduction to C++ (EEN-103)*, Academic Reinforcement Program, IIT Roorkee. Guided >50 freshers through C++ fundamentals and OOPs concepts, conducted regular weekly doubt-clearing sessions.

Student Mentor: Student Mentorship Program, IIT Roorkee. Provided guidance to 5 first-year undergraduate students through academic coursework, internship and placement preparation, and overall adjustment to university campus life.

SKILLS

Languages: Python, C, C++, SQL, VHDL

ML/DS Frameworks: PyTorch, TensorFlow, Transformers, OpenCV, Librosa

HONOURS AND AWARDS

Department Gold Medal, IIT Roorkee – Awarded for achieving the highest academic standing in Electrical Engineering.

Durga Award, IIT Roorkee – Awarded for excellent overall performance amongst all graduating B.Tech female students.

Air Cmdr Shyam Chand Mehra Scholarship, IIT Roorkee – Received for three consecutive years (2021–24), awarded annually to the student with the highest CGPA among 170+ students in the Electrical Engineering department.

1st Position in Rapid Chess Tournament, IIT Roorkee – Secured in Club Open for two consecutive years (2022, 2023).

JEE Advanced 2020 – Top 2.7% (among 150k candidates); **JEE Main 2020** – Top 0.5% (among 858k candidates).

RELEVANT COURSES

Data Structures and Algorithms, Introduction to C++, Applied Machine Learning, Linear Algebra, Economics, Deep Learning, Operating Systems

POSITIONS OF RESPONSIBILITY

Secretary, IIT Roorkee Chess Club: Headed a team of 30+ members, fostering a collaborative environment for the promotion of campus chess culture. Coordinated with chess clubs at other IITs to facilitate inter-college tournaments.

PR and Fundraising Volunteer, Girl Up Uthaan: Organized several awareness and donation drives for underprivileged children with 20+ contributors. Planned live sessions to spread awareness on mental health, menstrual hygiene etc.