

Janvijay Singh

Champaign, Illinois

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EDUCATION

- **University of Illinois Urbana-Champaign** Urbana, IL
Ph.D. in Computer Science · Focus: Reasoning in LLMs · Advisors: Profs. Dilek Hakkani-Tur & Gokhan Tur Aug 2024 - Present
- **Georgia Institute of Technology** Atlanta, GA
M.S. in Computer Science · Specialization: Machine Learning · GPA: 3.91/4.00 Aug 2021 - May 2023
- **Indian Institute of Technology Varanasi** Varanasi, India
B.Tech. in Computer Science and Engineering · GPA: 9.62/10.00 · Department Rank: 2/65 July 2014 - May 2018

INTERESTS & SKILLS

- **Research Interests:** Reasoning in LLMs, with an emphasis on understanding and improving generalization and faithfulness limits, failure modes, and missing design attributes of human-like reasoning. *Keywords:* Abstractions; Systematic Generalization (Easy-to-Hard, Weak-to-Strong); Continual Learning; Faithfulness; Interpretability.
- **Languages:** Python, Bash, C++, C, Java, Objective-C.
- **Technologies:** PyTorch, JAX, HuggingFace, vLLM, Axolotl, TRL, VeRL, CUDA, DeepSpeed, Megatron-LM, TGI, NVIDIA Triton, TensorBoard, Numpy, Pandas, Scikit-Learn, Matplotlib, TensorFlow, MXNet, MATLAB, Docker, Kubernetes, Helm, FastAPI, gRPC, Django, Flask, AWS, GCP, Terraform, Git, L^AT_EX.

PUBLICATIONS (= denotes equal contribution)

- JANVIJAY SINGH, DILEK HAKKANI-TUR. “Do LLMs Encode Functional Importance of Reasoning Tokens?”. Under review at the Annual Meeting of the Association for Computational Linguistics (ACL) 2026. Preprint: <https://arxiv.org/pdf/2601.03066>
- JANVIJAY SINGH, AUSTIN XU, YILUN ZHOU, YEFAN ZHOU, DILEK HAKKANI-TUR, SHAFIQ JOFY. “On the Shelf Life of Finetuned LLM-Judges: Future Proofing, Backward Compatibility, and Question Generalization.”. Under review at International Conference on Learning Representations (ICLR) 2026. Preprint: <https://arxiv.org/pdf/2509.23542>
- YEFAN ZHOU, AUSTIN XU, YILUN ZHOU, JANVIJAY SINGH, JIANG GUI, SHAFIQ JOFY. “Variation in verification: Understanding verification dynamics in large language models”. Under review at International Conference on Learning Representations (ICLR) 2026. Preprint: <https://arxiv.org/pdf/2509.17995>
- JANVIJAY SINGH, VILEM ZOUPAL, MRINMAYA SACHAN. “Enhancing Textbooks with Visuals from the Web for Improved Learning”. In Proceedings of the Conference on Empirical Methods in Natural Language Processing (EMNLP) 2023. <https://aclanthology.org/2023.emnlp-main.731.pdf>
- JANVIJAY SINGH⁼, MUKUND RUNGTA⁼, DIYI YANG, SAIF M. MOHAMMAD. “Forgotten Knowledge: Examining the Citational Amnesia in NLP”. In Proceedings of the Annual Meeting of the Association for Computational Linguistics (ACL) 2023. **Best Paper Honourable Mention.** <https://aclanthology.org/2023.acl-long.341.pdf>
- JANVIJAY SINGH, FAN BAI, ZHEN WANG. “Entity Tracking via Effective Use of Multi-Task Learning Model and Mention-guided Decoding”. In Proceedings of the European Chapter of the Association for Computational Linguistics (EACL) 2023. <https://aclanthology.org/2023.eacl-main.90.pdf>
- MUKUND RUNGTA⁼, JANVIJAY SINGH⁼, SAIF M. MOHAMMAD, DIYI YANG. “Geographic Citation Gaps in NLP Research”. In Proceedings of the Conference on Empirical Methods in Natural Language Processing (EMNLP) 2022. <https://aclanthology.org/2022.emnlp-main.89.pdf>

EXPERIENCE

- **Salesforce Research** Palo Alto, CA
LLM Reasoning – AI Research Intern · Manager: Drs. Austin Xu & Shafiq Joty May 2025 - Aug 2025
 - Designed systematic experiments to study generalization and failure modes of LLM-based judges for reasoning evaluation, with implications for evaluation reliability and scalable oversight. *Sumbitted couple of works to ICLR.*
- **TikTok** San Jose, CA
Social Recommendation – Machine Learning Engineer 2 Jan 2024 - July 2024
 - Performed feature engineering and value tree tuning for a set of neural recommendation models, significantly improving various engagement and followership metrics through A/B testing on live traffic.

- **Verneek AI** Manhattan, NY
Personalised Search for E-Commerce – Machine Learning Researcher/Engineer June 2023 - Jan 2024
 - Designed a personalized multimodal retrieval system using SOTA embedding models and developed its evaluation framework, enabling text and interaction-based personalization. Fine-tuned embedding models using adversarially generated e-commerce data from LLMs (LLAMA 2 70B, GPT-4), improving personalization results.
- **ETH Zürich** Zürich, Switzerland
AI in Education – Summer Research Fellow · Advisor: Prof. Mrinmaya Sachan July 2022 - Sept 2022
 - Analyzed the effectiveness and failure modes of vision-language models for enriching long-form text with images, focusing on relevance, diversity, and representational limitations in educational contexts. Accepted at EMNLP.
- **Walmart Group** Bangalore, India
Voice-Assistant for E-Commerce – Applied Scientist 2 Aug 2018 - July 2021
 - **Speech Recognition for Indic Languages:** Improved speech recognition for Indic languages using hierarchical CTC-based neural models. Achieved a ~38% relative WER improvement via joint-fusion of neural language models and Transducer loss. Improved decoder efficiency by introducing algorithmic approximations.
 - **Speech Synthesis for Indic Languages:** Benchmarked SOTA architectures, including Tacotron2, WaveGlow, WaveNet, and ClariNet. Innovated a multilingual training framework using automatic transliteration and learnable sentence-style embeddings to enhance conversational prosody. Demonstrated robustness in code-mixed and vernacular domains, outperforming commercial APIs.
 - Used multi-node training with Torchrun & DeepSpeed; developed 2x fast production-ready CUDA/cuDNN code.
- **Microsoft** Hyderabad, India
MS Excel – Software Engineer Intern May 2017 - Aug 2017
 - Developed UI dialogs and back-end routines for pivot-table functionality in Microsoft Excel for MacOS. Offered a full-time role for outstanding contributions.

PROJECTS

- **RNN-Transducer Prefix Beam Search:** Optimized prefix-beam search for speech recognition model with caching, batching, and 2-D beam pruning. >10x speed-up. Studied the increment in error-rates caused by these approximations. Open-sourced CUDA implementation. https://github.com/iamjanvijay/rnnt_decoder_cuda (66 stars)
- **RNN-Transducer Loss Function:** Devised diagonal parallelism to reduce time complexity from $\mathcal{O}(T * U)$ to $\mathcal{O}(T + U)$. Open-sourced TensorFlow implementation as a Python package. <https://github.com/iamjanvijay/rnnt> (45 stars)

ACHIEVEMENTS

- Honorable Mention for Best Paper Award, ACL conference, 2023.
- ETH Zurich Summer Research Fellowship (<0.8% acceptance), 2022.
- Best Team Award at Flipkart for Text-to-Speech excellence in vernacular domain, 2021.
- Winner, FinSBD-2 Task at FinNLP@IJCAI (Prize: USD 1000), 2020.
- Runner-Up, Walmart Data Science Hackathon (Prize: INR 20,000), 2019.
- Candidate Master on Codeforces (Max Rating: 1920), 2017.
- Ranked Top 0.82% globally in Algorithms on Hackerrank, 2017.
- 67th in ACM ICPC India Regionals (out of 402 teams), 2016.

RELEVANT COURSEWORK

- **Graduate Courses:** Deep Learning*, Machine Learning*, Natural Language Processing*, Computational Data Analysis*, Machine Learning Theory, Advanced Algorithms and Uncertainty, Computational Social Science, Languages and Computers, Language Interfaces and Communication.
- **Undergraduate Courses:** Artificial Intelligence, Computer Vision, Intelligent Computing, Theory of Computation, Optimisation Techniques, Probability and Statistics, Mathematical Methods, Operation Research, Discrete Mathematics, Computer Programming and Linux*.

* indicates teaching assistantship.