Prabhav Singh

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Research Objective

I am broadly interested in language modeling and speech representation, as well as their integration for solving real-world tasks. My research focus lies in developing efficient and adaptive learning methods by drawing on ideas from active learning, decision theory, and learning theory to improve data efficiency and model robustness. I am also interested in multimodal approaches to speaker diarization and recognition in the wild. I aspire to pursue a career in academia following my PhD, contributing to foundational research in these areas.

Education

Johns Hopkins University — Baltimore, MD
Masters of Science (Thesis) - Computer Science — *Expected May 2026*

- GPA: **3.95/4**, Specialization: Human Language Technologies
- Research Advisors: Prof. Jason Eisner, Prof. Jesus Villalba
- Selected Coursework: *Natural Language Processing, Advanced Statistical Self Supervised NLP, Statistical ML, Information Extraction from Speech, Replicable Theory of ML*

Delhi University — Delhi, India
Bachelor of Engineering (Honors) - Electrical Engineering — *August 2022*

- GPA: **3.83/4**, Field: Instrumentation and Control Engineering
- Research Advisors: Prof. KPS Rana, Prof. Vineet Kumar

Publications

1. Sensitivity of Stability: Theoretical & Empirical Analysis of Replicability for Adaptive Data Selection in Transfer Learning: **Prabhav Singh**, Jessica Sorrell. *arXiv preprint* 2025, *Under Review at TMLR*
2. The JHU-MIT Speaker Recognition System for NIST SRE24: Post-Evaluation Analysis: Jesus Villalba, J. Borgstrom, **Prabhav Singh** et al. IEEE Automatic Speech Recognition and Understanding Workshop, ASRU 2025 *[Accepted]*
3. Count Your Speakers! Multitask Learning for Multimodal Speaker Diarization: **Prabhav Singh**, Jesus Villalba, Najim Dehak. In Proceedings of ISCA Interspeech 2025 *[Oral, Top 20%].*
4. EmoJudge: LLM Based Post-Hoc Refinement for Multimodal Speech Emotion Recognition: **Prabhav Singh**, Jesus Villalba. In Proceedings of ISCA Interspeech 2025.
5. Multimodal Emotion Recognition Harnessing the Complementarity of Speech, Language, and Vision: Thomas Thebaud, Anna Favaro, **Prabhav Singh**, et al. In Proc. of the 26th International Conference on Multimodal Interaction (ICMI 2024), ACM *[First Position, EVAC, ICMI'24].*
6. SEMI-FND: Stacked Ensemble Based Multimodal Inferencing Framework for Faster Fake News Detection: **Prabhav Singh**, Ridam Srivastava, K. Rana, V. Kumar (2023). Expert Systems With Applications, Elsevier, 215, 119302.
7. A Topic Modeled Unsupervised Approach to Single Document Extractive Text Summarization: Ridam Srivastava, **Prabhav Singh**, K. Rana, V. Kumar (2022). Knowledge Based Systems, Elsevier, 246, 108636.
8. A Multimodal Hierarchical Approach To Speech Emotion Recognition From Audio and Text: **Prabhav Singh**, Ridam Srivastava, K. Rana, V. Kumar (2021). Knowledge Based Systems, Elsevier, 229, 107316.

Preprints, Workshops And Posters

1. Active Learning and Feature-Acquisition with LLMs and Humans: Prabhav Singh, Haojun Shi, Jason Eisner (2025). *[Best Poster Award, MASC-SLL].*
2. The JHU-MIT Submission to NIST 2024 Speaker Recognition Evaluation (SRE24): Jesus Villalba, J. Borgstrom, Prabhav Singh et al. (2024). *Accepted & Presented at NIST SRE24.*

Industry Experience

Machine Learning Engineering Intern — June 2025 – Present
Insors.ai — *San Jose, CA*

- Working on building **multi-agent LLM pipelines** for automating and integrating traditionally siloed financial processes.
- Involved in finetuning a two-stage hierarchical pipeline for tax bracket and chapter identification for products for an E-Commerce giant to **reduce effective cost by 40%.**

Founding Machine Learning Engineer January 2023 – August 2024
Sapper.ai *Bangalore, India*

- Responsible for developing **glazeDONUT** - An OCRLess document extraction transformer. The development was an Industry first. **Reduced extraction cost by 65%** per page and **improved accuracy by 30%.**
- Drove the ML efforts for 4 Clients to Production. The projects today contribute to **60% of the firm's revenue**.

Data Scientist - I July 2022 – January 2023
Ola *Bangalore, India*

- Worked on building and engineering data pipelines as part of the EDP team (Data Platform) for **customer facing real-time analytics** for multiple verticals at Ola.
- Migrated Ola's nationwide ride allocation ML Models to a **KubeFlow Platform** to enable MLOps. Managed over **2PB Data migration** from Azure to AWS to **reduce costs by 30%**.

Research Experience

Graduate Research Assistant August 2024 – Present
Center for Language & Speech Processing, JHU *Baltimore, MD*

- Currently working with **Prof. Jason Eisner** at CLSP, JHU. Working on developing AnnotationArena, a novel approach to make it easier, faster, and cheaper to spin up LLM-based annotation systems, drive their performance upward, and evaluate them.
- Also worked with **Prof. Jesus Villalba** on a novel method for speaker diarization by **replacing heuristic clustering** in inference stage with learned speaker counts via a multitask multimodal approach.
- Involved in the team that was selected for a submission to **NIST SRE 2024**. Implemented a novel quality filtering multimodal approach to low-resource speaker recognition.

Undergraduate Research Assistant October 2018 – April 2022
APC Lab, Delhi University *Delhi, India*

- Worked under Prof. KPS Rana and Prof. Vineet Kumar at the APC Lab (NSIT) during my undergraduate degree, where I mostly worked on **multimodal methods in NLP.**
- Published **3 peer-reviewed journal papers** with the lab working on fields like multimodal emotion recognition, benchmarking ensemble techniques for fake news detection and faster approaches for extractive summarization.

Skills

Languages: Python, C++, Stan

Databases: SQL (Postgres), NoSQL (MongoDB)

ML Areas: Statistical ML, Probabilistic Language Modeling, Language Processing, Speech Processing, Transformers, Active Learning, Reinforcement Learning, ML Learning and Stability Theory

ML Toolkits/Libraries: PyTorch, Tensorflow, HuggingFace, TRL, TTRL, Hyperion, pyAgrum, pgmpy

Infrastructure & Cloud: Apache Flink, Kubernetes, Docker, MLFlow, KubeFlow, AWS, Microsoft Azure

Teaching and Services

Graduate CA, Intro to Human Language Technologies (JHU) Aug – Dec 2026

Graduate CA, NLP for Self-Supervised Learning (JHU) Jan – May 2025

Instructor (Python), IEEE (Delhi University) Jan – May 2021

Activities and Awards

1. ***Premier Research Excellence Award*** (2021 & 2022): Awarded by Delhi University for publishing 3 papers in a journal with IF ≥ 8. Included Semester Scholarship for Fall 2022 and Fall 2021.
2. ***Academic Excellence Award*** (Fall 2019, Spring 2021): Awarded by Delhi University for ranking top 3 of my class during my undergraduate degree.
3. ***1st Position (Gridlock 2020)***: Awarded by Flipkart National Hackathon for developing a fashion trend predictor for the E-Commerce Giant in India.
4. ***Dramatics and Street Play*** (2018 - 2022): Perfomed as an actor in over 50 street plays as part of Ashwamedh (Dramatics Society of NSIT, DU). Won 7 awards over 4 years across the nation.