Mehak Singal

Research Assistant, IIT Madras, India

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Research Interests

Text-to-Speech, Computational Linguistics, Natural Language Processing, Machine Learning

Education

- **Indian Institute of Technology Madras** — Chennai, India
  BS - Data Science and Applications; GPA: 9.4/10 — *Jan 2021 - Sept 2024*
- **University of Nottingham, UK** — Nottingham, UK
  BEng - Product Design and Manufacture; First Class Honors (Offered but not accepted) — *Sept 2018 - June 2020*

Research Experience

- **Research Assistant | Text-to-Speech (TTS) Research Team** — Chennai, India
  AI4Bhārat, Indian Institute of Technology Madras — *Sept 2024 - Present*
  - Built tools and libraries such as Num2Words and IndicTextNorm, the first open-source text normalization tool for all 22 Indian languages, solving key challenges in linguistic processing across diverse scripts.
  - Developed end-to-end multilingual TTS models for India's 22 scheduled languages, overseeing data creation, quality checks, and model training, while collaborating with 20+ QA specialists on recording standards.
- **Research Intern | Text-to-Speech (TTS) Research Team** — Chennai, India
  AI4Bhārat, Indian Institute of Technology Madras — *Jan 2024 - Aug 2024*
  - Explored data pipelines to denoise and enhance ASR datasets, applied cross-lingual speech enhancement models, unlocking 1,704 hours of high-quality speech from 10,000+ speakers across 22 languages.
  - Compiled text corpora for 15 Indian languages, generating over 17,000 utterances per language by mining large-scale web data and working with native speakers for manual curation.

Publications and Patents

C=Conference, P=Patent, S=In Submission

- [**S**] ELAICHI: Enhancing Low-resource TTS by Addressing Infrequent and Low-frequency Character Bigrams. In proceedings of NAACL, 2025, *Srija Anand, Praveen Srinivasa Varadhan, Mehak Singal, Mitesh Khapra*
- [**C**] IndicVoices-R: Unlocking a Massive Multilingual Multi-speaker Speech Corpus for Scaling Indian TTS. NeurIPS, 2024, *Ashwin Shankar, Srija Anand, Praveen Srinivasa Varadhan, Sherry Thomas, Mehak Singal, Shridhar Kumar, Deovrat Mehendale, Aditi Krishana, Giri Raju, Mitesh Khapra*
- [**P**] Board Tapping Game. India Patent Office, Patent No. 370594-001, 2022, *Mehak Singal*

Relevant Projects

- **ELAICHI | Enhanced TTS for Low-Resource Language** — *June 2024 - Oct 2024*
  AI4Bhārat, Indian Institute of Technology Madras
  - Tracked experiments, managed distributed training, and curated benchmarks from low-frequency bigrams while training VITS on 1,000+ hours of annotated data across 15 languages to improve intelligibility in TTS systems.
  - Leveraged multilingual data, automatic speech recognition (ASR) enhancements, and synthetic data to significantly improve TTS performance in low-resource languages, achieving a 76.47% increase in intelligibility.
- **Num2Words | Text Normalization Library** — *July 2024 - Sep 2024*
  AI4Bhārat, Indian Institute of Technology Madras
  - Collaborated with language experts across India to gather and analyze data, conducting in-depth morphological analysis to handle complex numeral systems in various languages.
  - Expanded num2words Python package to support 22 Indian languages (up from 12), to improve multilingual accessibility in text-to-speech applications.
- **Multimodal Single-Cell Genomics | Predictive Analysis** — *June 2023 - Aug 2023*
  Institute of Mathematical Science, Chennai
  - Modeled DNA, RNA, and protein co-variation in hematopoietic stem cells maturing into blood cells, using a 300,000-cell dataset from Cellarity.
  - Developed predictive algorithms optimized for modeling genetic pathways, achieving a 15% improvement in accuracy rates for identifying covariation trends across time points in blood cell development.
- **ScanPlus | Handwritten Prescription Text Extraction** — *July 2022 - Dec 2022*
  Dr. Reddy's Laboratories, Hyderabad
  - Curated datasets of handwritten medical prescriptions and associated medicine information from diverse sources, addressing the challenge of illegible handwriting to improve the accuracy of text recognition.
  - Led a team to develop an NER model with active learning to extract key information such as medicine names, dosages, and diagnostic tests, using built-in custom annotation, achieving a top-five rank in the nation.

Technical Skills

- **Languages**: Python, JavaScript, C++, SQL, Bash, Java, R
- **Libraries and Tools**: PyTorch, Tensorflow, SparkNLP, sci-kit-learn, Git, Docker, NcMo, Wandb, HuggingFace
- **Web Development**: ReactJS, Vue.js, HTML, CSS, Flask, NodeJS, Javascript

Relevant Courses

- **IITM**: Deep Learning, Large Language Models, Multi-Armed Bandits, Reinforcement Learning, Computer Vision, Artificial Intelligence, Machine Learning Techniques, Tools in Data Science, Software Engineering
- **UoN**: Mathematics for Engineers, Statics and Dynamics, Design for Manufacture, Materials in Design, Materials and Manufacturing, User Centred Research and Design, Industrial Design and Professional Practice, Drawing for Design

Honors and Awards

- **IITM Merit Award with Gold Medal**: Awarded by IIT Madras for academic excellence, ranking among the top students in the cohort. 2024
- **AI Agent Hackathon Winner**: First prize winner in a data science hackathon held at IIT Madras. 2024
- **ACM Summer School Scholar**: Selected as one of 42 participants for this prestigious summer school held at IIT Madras. 2024
- **Smart India Hackathon Finalist**: Achieved Top 5 position in the NLP challenge by ISRO at a national-level hackathon organized by the Government of India. 2023
- **Harvard WeAmplify Scholarship**: Awarded a scholarship to attend the WeCode conference at Harvard. 2023
- **CCAIM Hardship Fund Scholar**: One of 150 global scholars chosen to attend the Cambridge Centre for AI in Medicine (CCAIM) summer school in the UK. 2023
- **Dr. Reddy's Hackathon Finalist**: Placed in the top five in a national data science hackathon organized by Dr. Reddy's Laboratories. 2023
- **Formula Dev Hackathon Winner**: Won first place in a data science hackathon at IIT Madras. 2022
- **Toycathon 2022 Winner**: First prize winner in Toycathon 2022, a nationwide competition with over 100,000 participants organized by the Government of India. 2022
- **Nottingham Engineering Excellence Award (NEEA)**: Awarded for achieving academic marks in the top 5% of my year group and department at the University of Nottingham. 2020
- **Nottingham Advantage Award**: Recognized for completing an additional 30 credits focused on developing industrial skills. 2020
- **UG International Progression Scholarship**: Earned a scholarship for academic performance during the 2018-2019 academic year at the University of Nottingham. 2019

Positions of Responsibility

- **Teaching Assistant** for the Modern Application Development Course at IIT Madras, supporting students in course-related tasks and projects. 2023
- Selected as a **Machine Learning Project Mentor** to guide students on their machine learning projects at IIT Madras. 2023
- Elected as **Group Leader** of Kaziranga House, where I helped guide students, represented their concerns, and facilitated communication with IIT Madras authorities. 2021
- **Peer Mentor** at the University of Nottingham, offering academic and personal support to fellow students. 2019
- Elected as the **Course Representative** for my program at the University of Nottingham, representing student interests to faculty. 2018

Extra-Curricular Activities and Volunteer Experience

- Received **black belt** in Taekwondo from **Kukkiwon University, South Korea**
- Won multiple **gold medals** in poomsae and speed kicking Taekwondo competitions.
- Delivered a presentation for the **Inspiring Women in STEM** program in Nottingham, UK, highlighting women's achievements in STEM fields.
- **Designed and sold stickers** on Etsy, promoting women in STEM through creative artwork.
- Won several prizes for art and sporting events during school and college.

Certifications

- **Coursera**: Deep Learning Specialization, Machine Learning Specialization, Natural Language Processing, Tensorflow Specialization, Introduction to Genomic Technologies, Data Visualization with Tableau Specialization
- **NPTEL**: Social Networks, AI: Constraint Satisfaction