

Karan Taneja

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Education

- **Georgia Institute of Technology** Atlanta, US
Jan'21 – Present
 - Ph.D. in Computer Science
 - > Advisor Prof. Ashok Goel
 - > Lab Design and Intelligence Lab, School of Interactive Computing
 - > Research Machine Teaching in NLP, AI Tools for Education
 - > Grade 4.00 /4
- **Indian Institute of Technology (IIT) Bombay** Mumbai, India
Jul'15 – Jun'20
 - Dual Degree (BS+MS) in Electrical Engineering
 - > Masters Specialization in Signal Processing and Communication
 - > Minor Computer Science and Engineering
 - > Grade 9.63 /10

Selected Publications

[\[Google Scholar\]](#)

- **Towards a Multimodal Document-grounded Conversational AI System for Education** [\[pdf\]](#)
Karan Taneja, Anjali Singh, Ashok K Goel
International Conference on Artificial Intelligence in Education 2025, Palermo, Italy
- **MuDoC: An Interactive Multimodal Document-grounded Conversational AI System** [\[pdf, demo\]](#)
Karan Taneja, Ashok Goel
AAAI-MAKE Symposium 2025, San Francisco, California, US
- **Can Active Label Correction Improve LLM-based Modular AI Systems?** [\[pdf, video\]](#)
Karan Taneja, Ashok Goel
Empirical Methods in Natural Language Processing 2024, Miami, US
- **Jill Watson: A Virtual Teaching Assistant powered by ChatGPT** [\[pdf\]](#)
Karan Taneja, Pratyusha Maiti, Sandeep Kakar, Pranav Guruprasad, Sanjeev Rao, Ashok Goel
International Conference on Artificial Intelligence in Education (AIED) 2024, Recife, Brazil
- **Monte Carlo Tree Search for Recipe Generation using GPT-2** [\[pdf, ppt\]](#)
Karan Taneja, Richard Segal, Richard Goodwin
International Conference on Computational Creativity 2023, Waterloo, Canada
- **Human-AI Interaction Design in Machine Teaching** [\[pdf, video\]](#)
Karan Taneja, Harshvardhan Sikka, Ashok Goel
Communication in Human-AI Interaction Workshop, IJCAI-ECAI 2022, Vienna, Austria
- **A Framework for Interactive Knowledge-Aided Machine Teaching** [\[pdf\]](#)
Karan Taneja, Harshvardhan Sikka, Ashok Goel
Preprint, arXiv:2204.10357, 2022
- **Bayesian Deep CNN Framework for Reconstructing Undersampled R-fMRI** [\[pdf, poster, video\]](#)
Karan Taneja, Prachi H. Kulkarni, S. N. Merchant, Suyash P. Awate
International Conference on Pattern Recognition 2020 (Virtual), 10-15 Jan. 2021, Milan, Italy

- **Exploiting Monolingual Speech Corpora for Code-mixed Speech Recognition** [[pdf](#), [poster](#)]
Karan Taneja, Satarupa Guha, Preethi Jyothi, Basil Abraham
Interspeech 2019, 15-19 Sept. 2019, Graz, Austria

Research and Work Experience

- **Graduate Research Assistant, PhD Candidate** Atlanta, US
Georgia Institute of Technology, Advisor: Prof. Ashok Goel *Mar'21 – Present*
Thesis: Conversational AI for Education – Design, Evaluation and Continual Improvement
LLM-BASED VIRTUAL TEACHING ASSISTANTS. Developed and evaluated an AI Teaching Assistant with a focus on document-grounding, safety, and use of publicly-available resources. Deployed in 20+ classes across multiple institutions. Analysis showed lower hallucinations, lower toxicity, and improved student perception of courses. See [AIED'24](#), [ITS'24](#), [L@S'24](#).
MACHINE TEACHING. Developed a continual learning pipeline for LLM-based AI agents using active label correction and a framework for designing human-AI collaborative annotation tools. Results show oracle performance can be achieved with a tiny fraction of data annotations and a 16% improvement over previous methods. See [EMNLP'24](#), [CHAI-IJCAI'22](#), [arXiv Preprint](#).
- **Research Intern** New York, US
IBM Thomas J. Watson Research Center
Advisors: Dr. Richard Goodwin, Dr. Richard Segal *May'23 – Aug'23*
Project: Long-form Story Generation using Cumulative Summarization and RL
Implemented a method to generate book-length stories using Google's Flan-T5 based summarizer working with generator model to handle long contexts. Training involved policy gradients for training summarizer as the ground truth summaries are unknown. See [poster](#).
- **Research Intern** New York, US
IBM Thomas J. Watson Research Center
Advisors: Dr. Richard Goodwin, Dr. Richard Segal *May'22 – Aug'22*
Project: Monte Carlo Tree Search for Recipe Generation using GPT-2
Implemented and evaluated a method to generate food recipes using GPT-2 with constraints imposed using reward functions which provide the most-promising-move in Monte Carlo Tree Search. See [ICCC'23](#).
- **Graduate Research Assistant** Mumbai, India
IIT Bombay
Advisors: Prof. Suyash Awate, Prof. Shabbir Merchant *Jan'19 – Jun'20*
Project: Functional-MRI Under-sampled Acquisition and Reconstruction using Neural Networks
Implemented a CNN framework model for functional-MRI reconstruction from under-sampled frequency-time acquisition to optimize for the functional connectivity maps of the human brain and estimated uncertainty on output to get insights about the quality of these maps. See [ICPR'20](#).
- **Research Intern and Student Collaborator** Hyderabad, India
Microsoft India Development Center in collaboration with IIT Bombay
Advisor: Prof. Preethi Jyothi *Oct'18 – Feb'20*
Project: Code-mixed (CM) Hindi-English Speech Recognition
Proposed two linguistically motivated algorithms to create synthetic CM speech while preserving span length distributions and phone transition probability distributions at switch points. See [IS'19](#). Investigated the effect of using synthetic CM speech to train acoustic models, used transcripts from the synthetic data to train language models and examined their effect on ASR performance in real Hindi-English CM speech. See [IS'20](#). Explored voice conversion for speaker variability CM text-to-speech systems. See [blog](#).
- **Teaching Assistant** Mumbai, India
IIT Bombay *Jul'18 – Nov'19*

- Introduction to Machine Learning, Prof. Sunita Sarawagi, Fall 2018
- Data Analysis and Interpretation, Prof. Shabbir Merchant, Summer 2019
- Data Analysis and Interpretation, Prof. Prasanna Charporkar, Fall 2019
- Electronic Design Lab, Wadhwani Electronics Lab @ IIT Bombay, Spring 2020

- **Research Intern**

Sony Semiconductor Solutions

Atsugi, Japan
May'18 – Jul'18

Project: Spherical CNNs for Human Detection Task in 360-degree Images

Extended the work on spherical CNNs to propose computationally light convolution operation on sphere S^2 and rotation group $SO(3)$ by factorization into depth-wise and point-wise spherical convolutions. This enabled the use of previously infeasible deeper architectures such as ResNet, DenseNet, etc. and improved performance in human-detection on a Theta 360-degree image dataset.

- **Undergraduate Research Assistant**

IIT Bombay

Mumbai, India

Advisors: Prof. Preethi Jyothi, Prof. Sunita Sarawagi

Jan'18 – May'18

Project: Attention-based and Segmental Models for Speech Recognition

Proposed a segmental model that maximized probability of output sequence of an attention model by introducing a latent segmentation for phoneme recognition on the TIMIT dataset in TensorFlow. Also published two blog posts on attention-based models (>14k total views). See blog [1](#) and [2](#).

- **Software Intern**

Philips Innovation Campus

Bangalore, India
May'17 – Jul'17

Project: Patient-motion Detection in MRI Scans Using Deep Neural Networks

Implemented a 3D CNN classifier, 2D CNN-RNN classifier, several feature-based classifiers that used wavelet and spectral analysis and performed feature selection for patient motion detection. Results showed that CNN-RNN model outperformed 3D-CNN model which outperformed feature-based classifiers.

Leadership and Volunteering

- **Asha for Education**

Treasury Team (June'24 – Present)

Revenue USD 4MM+, 200K+ students impacted

- **Asha for Education, Atlanta Chapter**

Co-President External Affairs (May'23 – Apr'24), *Treasurer* (Aug'22 – Apr'23)

[Asha for Education](#) is a non-profit organization supporting educational projects to bring socio-economic change through the education of disadvantaged children and women in India. Co-presided the Atlanta chapter working closely with a team of 30+ active volunteers.

- **Reviewer**

ACL Rolling Reviews 2023, AAAI Special Award Judge at ISEF 2022, ICPR 2020

- **Mentoring**

OMSCS student (Georgia Tech) on Hallucination Prediction in LLMs

OMSCS student (Georgia Tech) on Multimodal Conversational AI using Cloud Applications

Undergraduate student (UT Austin) in Creating a Conversational AI with Metacognitive Cues

Invited Talks and Panels

- Panel on 'The intersection of AI, teaching, learning, and job readiness in 2025', Georgia Tech (April 2025), Host: Prof. Olufisayo Omojokun
- [Intelligence and Computing Education Lab](#) at Utah State University (March 2025), Host: Prof. Yang Shi
- [Manifold Research](#) (December 2024), Host: Harshvardhan Sikka
- Worcester Polytechnic Institute - [AI for Adaptive EdTech](#) (October 2024), Host: Prof. Neil Heffernan

Coursework

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| Machine Learning | Machine Learning, Advanced Machine Learning, Reinforcement Learning, Probabilistic Graphical Models |
| AI/ML Applications | Natural Language Processing, Knowledge-based AI, Speech Recognition, Computer Vision, Image Processing, Advanced Image Processing, Medical Imaging |
| Computer Science | Computer Graphics, Algorithms, Matrix Computations, Optimization, Game Theory, Random Graphs, Random Processes, Markov Chains & Queuing Systems |
| HCI | Qualitative Methods in HCI, Educational Technology, Educational Game Design |

Technical Aptitude

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| Programming | Python, C/C++, Java, MATLAB/Octave, Web-Dev (HTML5, CSS3, JS) HuggingFace, SpaCy, LangChain, NLTK Django, MongoDB, AWS, GCP NumPy, |
| Packages/Tools | Pandas, Matplotlib PyTorch, TensorFlow, Keras, Scikit-Learn Streamlit, ReactJS, OpenCV Git, Docker, Linux, Bash |

Achievements and Awards

- **Undergraduate Research Award** IIT Bombay
Awarded to recognise exceptional work in quality and extent in the Dual Degree Project. 2020
- **Institute Academic Prize (IAP)** IIT Bombay
Awarded IAP for ranking 1st among 78 students in EE department for the year 2018-19. 2019
- **Kishore Vaigyanik Protsahan Yojana (KVPY) Fellow** Government of India
Awarded with KVPY fellowship and invited to National Science Camp at IISER Kolkatta 2014
- **National Talent Search Scheme (NTSS) Fellow** Government of India
Awarded with NTSS fellowship and an yearly stipend award for undergraduate education 2013