

Hitesh Kandala

Research Fellow, Microsoft Research, India

[Portfolio](#) [Github](#) [Google Scholar](#) [Email](#)

Education

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|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| July 2018 | Indian Institute of Technology Bombay | Mumbai, India |
| Jun 2022 | Bachelors in Technology (B.Tech.), Electrical Engineering CGPA: 8.9/10 Double Minor: Computer Science & Engineering and Machine Learning & Data Science | |

Experience

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| Mar 2023 | Microsoft Research, Redmond | Remote |
| Present | Research Fellow / Advisor: <i>Jianwei Yang</i> Working on generative models in the multi-modal domain with focus on diffusion to output an image or a short video given an image and a prompt/caption. | |
| Mar 2023 | Microsoft Research, India | Bangalore, India |
| Present | Research Fellow / Advisor: <i>Saikat Guha</i> Focused on segmenting newspaper images into articles, images, infographics, etc., to later help extract text from them to help the visually impaired access the daily news. Another focus is on seeing the efficacy of multimodal models that understand and describe images, infographics, etc., to make the process one-shot. | |
| May 2021 | Eberhard Karls Universität Tübingen, Germany | Remote |
| Jul 2021 | Research Intern / Advisor: <i>Prof. Jacob Macke</i> Investigated how model misspecification in inherent simulators affect recent simulation-based inference algorithms using a toy example of a mixed Gaussian of two normals with misspecified variance. Corrected the posterior inference by adding auxiliary variables sampled from Laplace distribution in order to make the assumed (misspecified) distribution overlap with the true distribution. | |
| Jul 2020 | Endimension Technology Pvt. Ltd | Remote |
| Aug 2020 | Research Intern / Advisor: <i>Bharadwaj Kss</i> Implemented an ensemble of two Retinanet models to detect pneumonia regions from chest X-rays of patients in India dealing with poor annotation and standardization. | |
| Nov 2018 | Unmesh Mashruwala Innovation Cell | Mumbai, India |
| May 2020 | Team Manager / Student-led <i>Technical Team</i> Operated as a part of team SeDriCa (Self Driving Car), aiming to develop India's first self-driving car targeting the level 5 autonomy for Indian conditions and roads. Started with training Traffic sign and light classifier to managing and implementing submodules in path planning and decision making subsystems to avoid obstacles and optimize path given the surroundings. | |

Research Publications

S=In Submission, W=Workshop | Also at [Google Scholar](#)

- [J] **Beyond Boundaries: A Novel Data-Augmentation Discourse for Open Domain Generalization**
Shirsha Bose, Ankit Jha, [Hitesh Kandala](#), Biplab Banerjee
Transactions on Machine Learning Research [TMLR]
- [J] **Exploring Transformer and Multi Label Classification for Remote Sensing Image Captioning** [\[Code\]](#)
[Hitesh Kandala](#), Sudipan Saha, Biplab Banerjee, Xiao Xiang Zhu
IEEE Geoscience and Remote Sensing Letters [IEEE GRSL]
- [S] **Multi-Stage Semantic Graph Embeddings for Compositional Zero-Shot Learning** [\[Code\]](#)
[Kandala et. al.](#)
Revise and Resubmit to Pattern Recognition Letters [In Submission to PRL]

Skills

Programming Languages: Python, C++, ROS, MATLAB, VHDL
Libraries and Frameworks: Pytorch, Hugging Face Transformers, Weights and Biases, Numpy, Tensorflow

Select Research Projects

Open Domain Generalization (ODG)

Jun'22 - Oct'22

Advisor: Prof. Biplab Banerjee

- › Introduced an end-to-end network that tackles the challenging ODG problem by jointly considering closed and open space **domain augmentation**, feature disentanglement, and semantic feature-space optimization.
- › Used a **conditional GAN** with **cycle consistency** constraint to synthesize augmented images diverse from the source domains by interpolating domain and category labels.

Compositional Zero Shot Learning

Feb'22 - May'22

Advisor: Prof. Biplab Banerjee

- › Implemented a novel **multi-stage graph** based model using separate GCNs for pairwise interaction between state, object and composition label embeddings and a composite GCN at the end utilizing all these information to solve CZSL.
- › Constructed joint embedding space between image features from **vision-image transformer** and embeddings from the composite GCN with the introduction of an **adaptive margin** based softmax formulation for the cross-entropy loss.

Captioning and Multi-label Classification

Dec'20 - May'21

Advisors: Prof. Biplab Banerjee, Prof. Sudipan Saha [🔗][Code]

- › Developed a **multi-task** learning model to improve remote sensing **image captioning** with the help of an additional auxiliary task i.e. multi-label classification to deal with the limited training data.
- › Built the model using a common CNN stacked **transformer** encoder and two different decoders for the two tasks.

Multi-Domain Few Shot Learning

Sep'21 - Nov'21

Advisor: Prof. Biplab Banerjee

- › Experimented with series and parallel **residual adapters** to improve the results on the 10-domain Decathlon dataset.
- › Implemented an **incremental** learning approach using Elastic Weight Consolidation loss as an alternative to adapters.
- › Explored **unsupervised**-learning approaches such as instance discrimination, SimClr for **few shot** in multi-domain.

Position of Responsibilities

Introduction to Machine Learning *Teaching Assistant*

Jan'22 - Apr'22

- › Conducted weekly problem solving sessions for a batch of **100** students, focused on clearing concepts.
- › Evaluated the students' performance regularly with assignments, paper reviews and kaggle competitions.

Unmesh Mashruwala Innovation Cell *Manager and Co-ordinator*

Dec'18 - Mar'20

- › Lead the path planning and decision making subsystems of the Self Driving Car team.
- › Planned, organized and publicized technical events to spread awareness among the freshmen.
- › Interviewed and recruited a total of 9 freshmen and 12 sophomores from a pool of 300+ undergraduate applicants

Achievements and Honours

Mahindra Rise Driverless Car Challenge One of the 11 finalists among 259 teams (prize money - \$ 1 million)

Student Design Challenge, American Society of Mechanical Engineers Overall winners in Asia-Pacific Regionals

JEE Advanced, previously IIT-JEE Achieved All India Rank of 168 among the 100,000 people shortlisted from JEE Mains

JEE Mains, previously AIEEE Achieved All India Rank of 37 out of roughly 1 million candidates

KVPY Fellowship, Indian Institute of Science (IISC) Achieved All India Ranks of 102 and 517 in consecutive years

NTSE Fellowship, Government of India Secured a position in the National Top 1000 to receive the scholarship.

National Cadet Corps (NCC) Completed a year long intensive course in the Maharashtra Regiment

Amazon ML Attended the Amazon ML Summer School 2021

VIJYOSHI - Indian Institute of Science (IISC) Attended the National Science Camp held at IISC, Bangalore

Relevant Coursework

Computer Science: Natural Language Processing, Intelligent and Learning Agents, Speech Processing, Advanced Machine Learning, Digital Image Processing, Data Structures and Algorithms

Mathematics: Linear Algebra, Calculus, Complex Analysis, Differential Equations, Probability, Statistics