

Hitesh Kandala

Computer Science & Engineering Applicant - PhD, Fall 2024

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

Education

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

Apr 2021 Present	Microsoft Research Redmond <i>Research Fellow Advisor: Dr. 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. Experimented with and curated a dataset for the models to train on such that they learn the notion of motion from these short videos.	Remote
Apr 2021 Present	Microsoft Research India <i>Research Fellow Advisor: Dr. 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.	Bangalore, India
Oct 2020 Mar 2021	Eberhard Karls Universität Tübingen, Germany <i>Research Intern Advisor: 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.	Remote
Mar 2020 Nov 2020	Endimension Technology Pvt. Ltd <i>Research Intern Advisor: Bharadwaj Kss</i> Implemented a TensorFlow model to detect the regions of pneumonia from the chest X-rays of patients in India dealing with poor annotation and standardization. Used an ensemble model of two RetinaNets to achieve Sensitivity and Specificity of more than 90% on the test dataset, consisting of over 3000 X-ray images.	Remote
Nov 2018 May 2020	Unmesh Mashruwala Innovation Cell <i>Team Manager Student-led 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.	Mumbai, India

Research Publications

S=In Submission, C=Conference, W=Workshop | Complete List 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]

Select Research Projects

Open Domain Generalization (ODG)

Jun'22 - Oct'22

Advisors: [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.
- Outperformed literature on **six** benchmark datasets in both open (MultiDataset) and closed (DomainNet) DG settings.

Compositional Zero Shot Learning

Feb'22 - May'22

Advisors: [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.
- Surpassed previous **state-of-the-art** results comfortably on the datasets of MIT-States, C-GQA and UT-Zappos50K.

Captioning and Multi-label Classification

Dec'20 - May'21

Advisor: [Prof. Biplab Banerjee](#) [[🔗](#)][[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.
- Surpassed state-of-the-art results by 3% on UC-Merced dataset to prove that having a related auxiliary task helps.

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.

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

Amazon ML Attended the Amazon ML Summer School 2021

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 Made it to the National Top 1000 who were to be awarded the scholarship

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

Extra-Curricular

National Cadet Corps Completed a year long course in the Maharashtra Regiment

Career Counselling Volunteered to teach students at local Municipal Corporation of Greater Mumbai schools

Football Won the tournament in the Annual Training Camp of National Cadet Corps

Cricket Runner's Up in the Mixed Corporate leather ball tournament as a part of the Microsoft team

Winter Trekking Completed a 6-day winter trek in Uttarakhand to reach the highest altitude of 12,500 feet / 3810 metres

References

- Jianwei Yang *Principal Researcher, Microsoft Research, Redmond* [[🔗](#)]
- Saikat Guha *Senior Principal Researcher, Microsoft Research, India* [[🔗](#)]
- Dr. Biplab Banerjee *Associate Professor, IIT Bombay, India* [[🔗](#)]