Sahil Khose

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RESEARCH INTERESTS

I am interested in learning with limited supervision, especially by developing solutions in domain generalization, domain adaptation, zero-shot learning, and continual learning.

EDUCATION

Georgia Institute of Technology, Atlanta, USA   Aug 2022 – May 2024
*M.S. in Computer Science with ML specialization (**Thesis Advisor** – Prof. Judy Hoffman)*   *GPA: 4.0/4.0*

Manipal Institute of Technology, Manipal, India   2018 – 2022
B.Tech. in Computer and Communication Engineering (Minor: Big Data | GPA: 10.0)   *CGPA: 8.56/10*

RESEARCH EXPERIENCE

Georgia Institute of Technology, Atlanta, USA   Jan 2023 – Present
Graduate Research Assistant at Hoffman Lab   *Thesis Advisor – Prof. Judy Hoffman*
- Addressing the syn-to-real gap and developing DG/DA algorithms for aerial imagery and exploring the impact of viewpoint variability on syn-to-real performance a facet of aerial imagery research that is unexplored.
- Spearheaded the generation of a synthetic aerial imagery dataset with varying weather, daytime, height, and pitch variations using the CARLA simulator and studying the effects of domain shift due to varying semantic conditions. [C4]

Georgia Institute of Technology, Atlanta, USA   Jan 2023 – May 2023
*Graduate Research Assistant at **Neural Data Science Lab** (NerDS)*   *Advisor – Prof. Eva Dyer*
- Led the development of a distribution-aware latent augmentation technique to address challenges in DG. [C3]
- The technique demonstrated significant performance in domain generalization (DG) and long-tailed recognition tasks.

Indian Institute of Science, Bangalore, India   Jul 2021 – Jul 2022
*AI Research Assistant at **Artificial Intelligence and Robotics Lab***   *Advisors – Prof. S. Sundaram & Dr. Chandan Gautam*
- Innovated solutions for various problems in the **Continual Generalized Zero-Shot Learning (CGZSL)** setting.
- Bachelor's Thesis: ***Zero-Shot Domain Generalization: Unseen Classes in Unseen Domains***.

Manipal Institute of Technology, Manipal, India   Apr 2021 – Oct 2022
Medical AI Research Assistant   *Advisor – Prof. Harish Kumar JR*
- Developed a medical diagnosis system for **fovea segmentation** using semi-supervised segmentation. [C2]
- Designed a **macular degeneration classification** system with interpretability for ophthalmology diagnosis. [C1]

Project MANAS – AI Robotics Research Team, MIT, Manipal, India   Feb 2019 – May 2021
AI Perception Developer GitLab | Website
- Achieved **World Rank 1** at the **27th Intelligent Ground Vehicle Competition** (IGVC 2019).
- Won the **Mahindra $1Million Challenge (top 13 out of 153 teams in India)**.
- Implemented **Lane Detection, Speed Bump Detection, Driving Imitation System, Depth Map Generation** using multiple cameras and LiDAR input using Deep Learning for our UGV and the self-driving car.

CONFERENCE PAPERS

C4. SkyScenes: A Synthetic Dataset for Aerial Scene Understanding
Under review at CVPR 2024   *Paper | Dataset | GitHub*
Sahil Khose, Anisha Pal, Aayushi Agarwal, Deepanshi, Prithvijit Chattopadhyay, Judy Hoffman

C3. WACV 2024: LatentDR: Improving Model Generalization Through Sample-Aware Latent Degradation & Restoration
*Winter Conference on Applications of Computer Vision **(WACV) 2024***   *GitHub | Paper*
Ran Liu, **Sahil Khose**, Jingyun Xiao, Lakshmi Sathidevi, Keerthan Ramnath, Zsolt Kira, Eva L. Dyer

C2. INDICON 2023: Explainable Classification of Macular Degeneration Using Deep Learning   Paper
Sahil Khose*, Ankita Ghosh*, Yogish Kamath, Neetha Kuzhuppilly, Harish Kumar J. R.

C1. INDICON 2023: Fovea Segmentation Using Semi-Supervised Learning   Paper
Ankita Ghosh*, **Sahil Khose***, Yogish Kamath, Neetha Kuzhuppilly, Harish Kumar J. R.

Workshop Papers

W7. NeurIPS 2022: Continual VQA for Disaster Response Systems | Sep 2022
*[Poster] Tackling Climate Change with ML at **NeurIPS 2022*** | *GitHub | Paper*
Aditya Kane, V Manushree*, **Sahil Khose***

W6. ICML 2022: An Efficient Modern Baseline for FloodNet VQA | May 2022
*[**Best Paper Award!**] New in ML at **ICML 2022*** | *GitHub | Paper*
Aditya Kane, **Sahil Khose***

W5. ACL 2022: Transformer based ensemble for emotion detection | Mar 2022
*[**Oral**] WASSA at **ACL 2022*** | *GitHub | Paper*
*Aditya Kane, Shantanu Patankar, **Sahil Khose**, Neeraja Kirtane*

W4. NeurIPS 2021: A Studious Approach to Semi-Supervised Learning | Sep 2021
*[Poster] ICBINB at **NeurIPS 2021*** | *GitHub | Paper*
Sahil Khose, Shruti Jain*, V Manushree**

W3. NeurIPS 2021: XCI-Sketch | Aug 2021
*[**Oral**] New in ML, [Paper] ML4CD, [Paper] CtrlGen, [Poster] DGM at **NeurIPS 2021*** | *GitHub | Paper*
V Manushree, Sameer Saxena, Parna Chowdhury, Manisimha Varma, Harsh Rathod, Ankita Ghosh, **Sahil Khose***

W2. NeurIPS 2021: Semi-Supervised Classification & Segmentation on High Resolution Aerial Images | May 2021
*[**Spotlight Paper!**] Tackling Climate Change with ML at **NeurIPS 2021*** | *GitHub | Paper*
***Sahil Khose**, Abhiraj Tiwari, Ankita Ghosh*

W1. NAACL 2021: BERT Transformers in Extraction of Health Information from Social Media | Apr 2021
*[**Top Performer Award!**] Published in proceedings of **NAACL 2021** at SMM4H workshop* | *GitHub | Paper*
S Ramesh, **Sahil Khose***, Abhiraj Tiwari*, Parthivi Choubey*, S Kashyap*, K Lakara*, N Singh*, <u>Ujjwal Verma</u>*

Selected Projects

1. Domain Generalization: Tackling Diversity and Correlation Shifts *YouTube | GitHub* | Fall 2022
- ***Course Project:*** *CS 7647 Machine Learning with Limited Supervision [Fall 2022] (**Prof. Judy Hoffman**)*
- Studied two problems we encounter with change in data distribution – **Diversity Shift** and **Correlation Shift**.
- Combined **RSC** and **VREx** to be robust to both the data shifts. Performed best on three datasets and competitive on others.

2. Zero-Shot Domain Generalization: Unseen Classes in Unseen Domains | Jan 2022 - Apr 2022
- ***Bachelor's Thesis:*** Developed a **CLIP** based **CNZSL** architecture to address **domain generalized zero-shot learning**.
- Evaluated on **six different unseen domains** under **three different zero-shot** settings and the proposed solution outperforms state-of-the-art models in this problem setting in most of the domains on the **DomainNet dataset**.

Teaching Experience

Graduate Teaching Assistant: CS 7647 Machine Learning with Limited Supervision *Website* | Fall 2023
- **Instructor: Prof. Judy Hoffman** | Mentored 50 students to apply and advance state-of-the-art techniques for learning from visual data with limited human supervision, overseeing 12 research projects.

Professional Services

Reviewer: **1. NeurIPS 2023**: *ICBINB and DGM4H* | **2. ICCV 2023**: *WiCV Workshop* | **3. NAACL 2021**: *SMM4H Workshop*
Volunteer: **NeurIPS 2022**: In-person conference at New Orleans.

Extracurricular

YouTube Channel: *Conducts **explanations** on cutting-edge research papers in the field of AI. **20+ videos and 9000+ views**.*
FruitPunch AI – AI Head : *Established the first international chapter of the non-profit org **headquartered in Europe**.*
Research Society Manipal – AI Mentor : ***Mentoring** several students to pursue research in the field of Deep Learning.*
Medium | **WordPress** | **Website Feed**: *Documented my BTech college journey with a series of tech and non-tech **blog posts**.*