Sahil Khose

(+1) 470 929 5628 ⋄ ✉ sahil.khose@gatech.edu ⋄ 🌐 sahilkhose.github.io

in/sahilkhose ⋄ ⌂/sahilkhose ⋄ 🎓Google Scholar

RESEARCH INTERESTS

Computer Vision, Domain Generalization, Continual Zero-Shot Learning, Semi-Supervised Learning and NLP. Solving deep learning problems using a limited (ideally zero) amount of data is what piques my interest.

EDUCATION

Georgia Institute of Technology, Atlanta, USA   Aug 2022 – May 2024
M.S. in Computer Science (Specialization: Machine Learning)   *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 Neural Data Science Lab (NerDS)   *Advisor – Dr. Eva Dyer*
- Working on the domain shifting issue using domain generalization by utilizing sample-to-sample relationships.

Georgia Institute of Technology, Atlanta, USA   Jan 2023 – Present
Graduate Student Researcher at Hoffman Lab   *Advisor – Dr. Judy Hoffman*
- Exploring methods to assess synthetic to real generalization of vision modules for aerial imagery.

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

Manipal Institute of Technology, Manipal, India   Apr 2021 – Jul 2022
Medical AI Research Assistant   *Advisor – Dr. Harish Kumar JR*
- Developed a medical diagnosis system for **fovea segmentation** using semi-supervised segmentation. [P1]
- Worked on **macular degeneration classification** with interpretability for ophthalmology diagnosis. [P1]

Project MANAS – **AI Robotics Research Team, MIT, Manipal, India**   Feb 2019 – May 2021
AI Perception Developer GitLab | Website
- Built a UGV robot for the **27th Intelligent Ground Vehicle Competition** held in Michigan, USA.
- Worked on developing a **level 2-3 autonomy** car on Indian roads for the **Mahindra $1Million Challenge.**
- 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.

ACHIEVEMENTS

- **Project MANAS** stood **World Rank 1** at the **27th Intelligent Ground Vehicle Competition** (IGVC 2019).
- **IGVC 2019 Awards:** Grand Award - 1st (Lescoe Cup), Interoperability - 1st, Design - 2nd, Cybersecurity - 3rd.
- **Project MANAS** won the the **Mahindra $1Million Challenge (top 13 out of 153 teams in India)**.
- **Top performer** on Task 1 & 6 with special recognition on multi-task performance at SMM4H, **NAACL 2021**.
- Received the **Best Paper Award** at New In ML, **ICML 2022**.

RELEVANT COURSES

- CS 7641: **Machine Learning** *by Mahdi Roozbahani* - Spring 2023
- CS 8803: **ML with Limited Supervision** *by Judy Hoffman* - Fall 2022
- CS 6476: **Computer Vision** *by James Hays* - Fall 2022
- CS 7648: **Interactive Robotic Learning** *by Matthew Gombolay* - Fall 2022

Publications

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

W5. ACL 2022: Transformer based ensemble for emotion detection   Mar 2022
- *[Oral] WASSA at **ACL 2022** GitHub | Paper (aclanthology)*
- Authors: *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*
- Authors: ***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*
- Authors: *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*
- Authors: ***Sahil Khose**, Abhiraj Tiwari, Ankita Ghosh*

W1. NAACL 2021 BERT Transformers in Extraction of Health Information from Social Media   Apr 2021
- *[Oral] Published in proceedings of **NAACL 2021** at SMM4H workshop GitHub | Paper (aclanthology)*
- Authors: *S Ramesh*, **Sahil Khose***, Abhiraj Tiwari*, Parthivi Choubey*, S Kashyap*, K Lakara*, N Singh*, Ujjwal Verma*

P1. AMD Classification and Fovea Segmentation using Semi-Supervised Learning and XAI   Oct 2021
- Authors: ***Sahil Khose***, Ankita Ghosh*, Harish Kumar J. R.*

Selected Projects

1. DoGe: Domain Generalization *YouTube* | *GitHub*   Oct 2022 - Nov 2022
- **Course Project:** *CS 8803 Machine Learning with Limited Supervision [Fall 2022] (Dr Judy Hoffman)*
- Studied two problems we encounter with change in data distribution – **Diversity Shift** and **Correlation Shift**.
- Developed an algorithm with a combination of **RSC** and **VREx** to be robust to both the data shifts.

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**.

3. Deep Learning Architecture Implementations
- *Limited Supervision Architecture Zoo GitHub*: Implemented vital components of **ViT, GAN, CycleGAN and DINO**.
- *StackGAN for Text-to-Image Generation GitHub*: 2-stage GAN with BERT representations for photo-realistic bird images.
- *QANet (Question-Answering) GitHub*: Exclusively convolution and self-attention based Question and Answering model.
- *Stock Prediction Hyper Graphs GitHub*: Hypergraph CNN, BERT, and LSTM and attention based 500 stocks prediction.
- *Neural Machine Translation GitHub | Demo*: Seq2seq bi-LSTM with attention and hybrid char-word model. 37 BLEU Es-En.

Technical Skills

Languages: Python, C++, Java, C
Tools and Libraries: PyTorch, NumPy, OpenCV, Matplotlib

Extracurricular

NeurIPS 2022 Volunteer: *Volunteered to help the main conference poster session and workshops run smoothly.*
NAACL 2021 Reviewer: *Reviewed multiple research papers as a part of the review committee for SMM4H Workshop.*
YouTube Channel: *Conducts **explanations** on cutting edge research papers in the field of AI. **20+ videos and 7000+ 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**.*