Hiran Sarkar

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Area(s) of interest: Rigid and deformable 3D/4D reconstruction & generation, implicit deep learning, 3D and 2D human pose estimation, generative modeling, video understanding

EXPERIENCE

Technical University of Munich, CAMP, Remote - *Research Intern*

APRIL 2023 - Present

- Dynamic Scene Representation using NeRF and Neural ODE advised by *Dr. Benjamin Busam*.

Sony Research India, Remote - *Research Intern*

APRIL 2023 - Present

- Worked on Open-set Object Detection where we addressed the high unknown misclassification problem. We introduced a clip based clustering based module that forms clusters in the semantic space which forms a clear boundary separation especially between classes of close semantic proximity. The paper is accepted at **WACV 2024**.
- Currently working on incremental few-shot object detection and conditional video generation.

Independent Research

JUNE 2022 - Nov 2022

- Rigid & non-rigid 3D reconstruction, human pose estimation *advised by Dr. Rishabh Dabral*

Indian Institute of Science, Bangalore, Vision & AI Lab, Remote - *Research Intern*

JUNE 2021 - MAY 2022

I have worked on **Domain Adaptation** and **Domain Generalization** using self-supervision across multiple settings under *Dr. Venkatesh Babu*.

- Worked on unsupervised source-free domain adaptation technique using a subsidiary pretext task which acts as an aid to help attain domain invariance thereby minimizing domain discrepancies. The paper is accepted at **ECCV 2022**.
- Developed an unsupervised non-source-free domain adaptation technique using a Bag-of-VisualWords (BoW) like representation. We looked into the tradeoff between negative transfer risk and domain invariance exhibited at different layers of the network. The paper is accepted at **NeurIPS 2022**.

Teamcognito, Kolkata - *Research Intern*

OCT 2020 - JAN 2021

- Worked on a Speech Recognition model using Recurrent Neural Network Transducer. Trained on the **Common-Voice** dataset.
- Worked on "Malware Detection on IoT devices based on traffic Meta-Data"

EDUCATION

Netaji Subhash Engineering College, Kolkata - *Bachelor's of Technology*

JULY 2019 - JULY 2023

Major in Computer Science and Engineering

CGPA: 9.14 / 10

PUBLICATIONS

Open-Set Object Detection By Aligning Known Class Representations [Link]
*Winter Conference on Applications of Computer Vision (WACV) 2024. (**Oral Presentation)**
Hiran Sarkar, Vishal Chudasama, Naoyuki Onoe, Pankaj Wasnik, Vineet Balasubramanian

Subsidiary Prototype Alignment for Universal Domain Adaptation [Link]
Neural Information Processing Systems (NeurIPS) 2022
Jogendra Nath Kundu*, Suvaansh Bhambri*, Akshay Ravindra Kulkarni*, **Hiran Sarkar**, Varun Jampani,
Venkatesh Babu Radhakrishnan

Concurrent Subsidiary Supervision for Unsupervised Source-Free Domain Adaptation [Link]
European Conference on Computer Vision (ECCV) 2022
Jogendra Nath Kundu*, Suvaansh Bhambri*, Akshay Ravindra Kulkarni*, **Hiran Sarkar**, Varun Jampani,
Venkatesh Babu Radhakrishnan

PROJECTS

Dynamic Scene Reconstruction with NeRF and Neural ODE (In Progress)
We use simulated scenes of damped and frictionless pendulum, and a ball rolling down a hill, curated from
Blender. We learn the spatial information using Neural Radiance Fields and the temporal information using
neural ODE. The resultant setup, helps not only in reconstruction of the scenes, but

- Extrapolation of the scenes
- Generalizing across different physical parameters (friction) of the scenes
- Generalizing across different initial positions of the objects in the scenes

Image Style Transfer - [Link]
Implemented the paper "*Rethinking and Improving the Robustness of Image Style Transfer*" in TensorFlow.
This paper focuses on why pre-trained networks of the ResNet family have a detrimental effect on Image
Style Transfer as opposed to a pre-trained VGG network even though ResNet is better in downstream
tasks like classification. It uses the L-BFGS (quasi-newton method) optimizer which improves the speed of
the training task.

Cartoon GAN - [Link]

This project is to transform photos of real-world scenes into cartoon-style images. It uses a generative adversarial network for training, consisting of a generator and a discriminator. It uses two losses. Adversarial loss (discriminator loss), which helps drive the generator to achieve the desired manifold transformation; and content loss (perceptual loss) which preserves the image content during cartoon stylization.

REVIEWER

- **ICLR 2023,** Neural Fields across Fields Workshop

OPEN SOURCE

Winter of Code at DeepFusionAI, Remote - *Open Source Developer*

DEC 2020 - FEB 2021

- Worked on Social Distance Detector using MobileDets.

Contributor at TensorFlow

- Fixed various bugs and added a feature in the main TensorFlow GitHub repository.
  - Added the axis argument in tensorflow.keras.losses.categorical_crossentropy() and in tensorflow.keras.losses.binary_crossentropy(). **[Link]**
  - Fix for Conv1DTranspose, Conv2DTranspose, Conv3DTranspose layers when filter=0 by adding a ValueError. **[Link]**

SKILLS

Language(s): Python, JAVA, C, C++, HTML, CSS

Frameworks: Pytorch, TensorFlow, Keras

Tools: Blender, VSCode, PyCharm, Colmap