KSHAMA NITIN SHAH

Interested in developing 'self-supervised' computer vision models that learn from multimodal sensation specifically natural language and cross modal image data.

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OBJECTIVE

Seeking Spring 2023 Co-Op/Internships / Full time opportunities in the field of Machine Learning, Deep Learning or Computer Vision

RESEARCH AND WORK EXPERIENCE

Research Assistant

Dr. Andrew Owens' Lab, University of Michigan, Ann Arbor

May 2022 – Present | Ann Arbor, MI

- Researching a novel method to perform cross-modal image registration.
- In specific, I am using the multiscale contrastive random walk model to perform self-supervised optical flow prediction to match RGB images at time 't' and Depth image pairs 't+1' respectively

Research Associate

Dr. Justin Johnsons' Lab, University of Michigan, Ann Arbor

Aug 2022 – Present | Ann Arbor, MI

- Researching the effect of nature, statistics and class balance of pre-training datasets on self-supervised vision tasks.

SELECTED PROJECTS

Self Supervised Object Detection With Multimodal Image Captioning **(GitHub Link)**

Feb 2022 – Apr 2022 | University of Michigan, Ann Arbor

- Developed a novel pipeline to generate pseudo object class labels and pseudo bounding box predictions
- Generated pseudo object class labels by prompting an image captioning model and further filtering them
- Obtained pseudo bounding box coordinates by generating heatmaps using the GradCAM model
- Finetuned the model using 1% of the PASCAL VOC Detection dataset
- Obtained an mAP of 21.57% after training an FCOS Object Detector using the best performing model as compared to 30% obtained by the SOTA model for unsupervised object detection

Language Supervised Vision Pre-training for Fine-grained Food Classification

Mar 2022 - Apr 2022 | University of Michigan, Ann Arbor

- Pre-trained a downsized, memory-efficient image captioning model that used a RegNetX-800MF and a 2 layer transformer on the Food-101 dataset.
- Obtained a top 5% classification accuracy of 23.76% by doing zero-shot transfer and a classification accuracy of 20% after fine-tuning the above model on the downstream task of fine-grained food classification

A Monocular Local Mapper for Urban Scenes **(GitHub Link)**

Aug 2021 - Dec 2021 | University of Michigan, Ann Arbor

- Developed a model that performs semantic segmentation, object detection and depth estimation simultaneously using YOLOv1 and U-Net model
- Used a common shared backbone MobileNetV3 feature extractor pre-trained on ImageNet to extract feature maps
- Achieved a total accuracy of 83% for object detection, semantic segmentation and depth estimation

EDUCATION

M.S. in Electrical & Computer Engineering **(Signal and Image Processing and Machine Learning)**

University of Michigan, Ann Arbor

Aug 2021 – April 2023 | GPA : 3.85/4.00

B.Eng. in Electronics & Communication Engineering

Birla Institute of Technology & Sciene. Pilani

Aug 2016 – June 2020 | GPA : 9.61/10.00

COURSEWORK

Computer vision, Machine learning, Deep learning for computer vision, Matrix Methods for signal processing, machine learning and data analysis , Probability and Random processes

SKILLS

Python | Pytorch | NumPy | TensorFlow | MATLAB | Julia | C | Java

LEADERSHIP EXPERIENCE

Youth Entrepreneurship Program, AIESEC

Jul 2017 – Aug 2017

- Contributed to the United Nations' Sustainable Development Goal of Decent Work and Economic Growth by boosting sales of local SMEs and advising student entrepreneurs via AIESEC's Global Volunteer Exchange Program in Indonesia

Vice President, University Relations AIESEC in Dubai

Jan 2018 – Jun 2018

- Organized informational events across universities to increase awareness about AIESEC's exchange programs
- Facilitated the successful completion of several international exchange experiences for students across Dubai

Core Committee Member, IEEE, BITS Pilani, Dubai Charter

Aug 2017 – Aug 2019

- Organized and managed tech competitions and guest lectures by distinguished speakers in the university