Atharva Chandak

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Education

Birla Institute of Technology and Science, Pilani (BITS Pilani)
Pilani, India

B.E. Computer Science
AUG 2019 - PRESENT

Research Experience

Visual Computing Group, Harvard SEAS
Cambridge, USA (Remote)

Visiting Undergraduate Research Intern
JAN 2022 - PRESENT

Supervisor: Prof. Hanspeter Pfister

- Working on **3D neuron segmentation** on the SNEMI3D dataset as part of the Connectomics project.
- Leveraging **semi-supervised methods** to improve upon the performance of **3D instance segmentation**.
- Inspecting **long range affinity learning using transformers** for improving efficiency.

Artificial Intelligence And Robotics Laboratory, Indian Institute of Science
Bangalore, India (Remote)

Research Intern
JUN 2021 - DEC 2021

Supervisor: Dr. Suresh Sundaram

- Worked on **Generalized Continual Zero Shot Learning** for various **Computer Vision tasks.**
- **Integrated incremental learning with the zero shot learning framework** for more realistic adoption of DL methods.
- Extended the work to **generalized, out of distribution tasks** enabling **task free learning**.

CSIR-CEERI
Chennai, India (Remote)

Research Intern
MAY 2021 - AUG 2021

Supervisor: Dr. Amalin Prince & Mr. J Suriya Prakash

- Worked on **texture classification** of images using both **traditional ML** and **deep learning** based methods.
- Used traditional computer vision **algorithms like FAST, ORB & BRISK** combined with ML classifiers like **SVMs, KNNs, etc.**
- Extended the project to also implement simple image segmentation networks for performing **texture segmentation**.
- Applied these to **distinguish different types of industrial leather** produced & detect any cracks/faults in them.

Academic Projects

Fine-grained Action Recognition using Vision Transformer
Pilani, India

Supervisor: Dr. Kamlesh Tiwari
APR 2021 - PRESENT

- Investigating various **Vision-Transformer networks** for fine-grained human action recognition.
- Reviewed the existing works on fine-grained action recognition and **summarised the major research gaps.**
- Applying **better temporal modelling techniques** and using direct **RGB frames** for the classification task.
- Exploring other ways to improve upon the current state-of-the-art networks.

Image Super Resolution with Deep Learning
Pilani, India

Supervisor: Dr. J. Jennifer Ranjani
JAN 2021 - APR 2021

- Analysed and implemented various Deep Learning techniques for image super resolution.
- Reviewed **traditional Deep CNN based approches (EDSR, RCAN, etc.)**, their drawbacks and possible improvements.
- Implemented **GAN based methods (SRGAN, ESRGAN, etc.)** for achieving **higher perceptual quality** of images.
- Deduced various possible **future directions of research** for enhancing performance of these deep networks.

Other Projects

CapsViT for Deepfake Detection
Remote

ICLR CoSubmitting Summer(CSS) 2022
AUG 2021 - PRESENT

- Evaluated the performance of **Vision Transformers for deepfake detection** (images and videos both) task.
- Reviewed existing **Capsule Network architectures** leveraging their desired properties for deepfake analysis.
- Exploring a **novel architecture combining Capsule Networks with Vision Transformers.**
- **Improving spatial attention** to better focus on specific regions where the adversarial detection models are likely to fail.

Competitions

E-Yantra Robotics Competition
e-Yantra IIT Bombay

Rank: top 20
SEP 2020 - MAR 2021

- Were in the **top 20 teams** among 472 teams in the Robotics innovation challenge organized by IIT Bombay.
- **Maximized the number of delivery and returns of the parcels** by the UAV withinin fixed time to maximize score.
- Involved **control systems, path planning, image processing for QR scanning and marker detection, and developing algorithms** for a Gazebo simulated UAV.

AI RoboSoccer
IEEE BITS Pilani Chapter

Rank: 3rd
MAR 2021

- **Trained an RL Agent** which maximized the performance score of the simulated soccer team.
- Objective **reward** was **based on the number of goals scored and the passing accuracy** of the simulated players
- Used the **PPO algorithm** from **stable-baselines library** implementation for training the RL agent.

Skills

Languages	**Advanced:** Python | **Intermediate:** C/C++, JavaScript
Deep Learning	**Advanced:** Pytorch | **Basic:** Tensorflow, Keras
Machine Learning	**Advanced:** scikit-learn, Numpy | **Intermediate:** OpenCV, Pandas, Matplotlib
Robotics	**Intermediate:** Robot Operating System(ROS)
Web dev	**Advanced:** Flask | **Intermediate:** Nodejs, Expressjs, React, HTML5, SASS
Others	Git, Linux

Achievements

2021 **Top 20**, among 472 teams, in E-Yantra Robotics Competition
2021 **3rd**, among 148 teams in AI Robosoccer
2019 **AIR 598**, out of 1.23 million students in JEE MAIN examination
2019 **AIR 2249**, out of 0.15 million students in JEE Advanced examination

Co-Curriculars and Volunteering

BITS-ACM Student Chapter
Pilani, India

Core Team Member
AUG 2019 - PRESENT

- **Organized a software development hackathon** (HackBITSPilani).
- **Contributed** and **managed various open source projects** by BITS-ACM.
- Developed **frontend web game** for Checkmate-2020, an annual puzzle based event organized by the chapter.

National Service Scheme(NSS) at BITS Pilani
Pilani, India

Volunteer
AUG 2019 - PRESENT

- Volunteering at **Computer Literacy Program** team of NSS BITS Pilani.
- Helped organise various social impact events like **Blood Donation Camps, Youth conference, etc.** for the people of Pilani.