Atharva Chandak

Final year undergrad at BITS Pilani

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Education

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

Pilani, India

Bachelor of Engineering in Computer Science

AUG 2019 - PRESENT

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, LaTeX

Research Experience

Airlab, Carnegie Mellon University

Pittsburgh, USA (Remote)

Intern

AUG 2022 - PRESENT

Supervisor: Prof. Sebastian Scherer

- Working on **long-range detection** and **tracking** of aerial vehicles to autonomously avoid collisions.
- **Analysing a new dataset** for allowing building better models robust to out of distribution climatic conditions.
- **Designing optimized models** for allowing **real-time usage** on the drone capturing high resolution feed from multiple cameras.

Visual Computing Group, Harvard SEAS

Cambridge, USA (Remote)

Visiting Undergraduate Intern

JAN 2022 - MAY 2022

Supervisor: Prof. Hanspeter Pfister

- Contributed to the **Pytorch Connectomics** package adding cellpose model for neuron instance segmentation.
- Explored **semi-supervised methods** to improve upon the performance of **3D segmentation**.
- Designed an end-to-end **pipeline using long range affinity learning and transformers** for improving model accuracy.

Artificial Intelligence And Robotics Laboratory, Indian Institute of Science

Bangalore, India (Remote)

Intern

JUN 2021 - DEC 2021

Supervisor: Prof. 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)

Summer 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.

Selected Projects

Light Invariant Action Recognition

Pilani, India

Supervisor: Prof. Kamlesh Tiwari

MAY 2022 - PRESENT

- Building **light invariant action recognition systems** for applications in autonomous systems, surveillance, etc.
- Designed a **two-stream transformer architecture** which attends to **raw and GIC frames** to perform the recognition.
- **First work to target multiple data modalities** using a single architecture for both **visible RBG** as well as **infrared** videos.
- Achieved **state-of the-art on** four benchmark datasets - **ARID**, **HMDB51**, **UCF101**, and **InfAR**.

Advertisement Understanding

Pilani, India

Supervisor: Prof. Poonam Goyal

JAN 2022 - PRESENT

- Creating automatic **multimodal advertisement understanding** methods to perform tasks such as Ad generation, etc.
- Leveraging **external knowledge** for allowing better learning by the models and utilize it for knowledge graph creation.
- Devising **multimodal transformer** based on **ad image**, **captions**, **topic model** and **external knowledge** to perform **VQA**.

Fine-grained Action Recognition using Vision Transformer

Pilani, India

Supervisor: Prof. Kamlesh Tiwari

APR 2021 - DEC 2021

- Investigated 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.**
- Assessed **better temporal modelling techniques** and using direct **RGB frames** for the classification task.
- Explored the use of a **new loss function** for better learning by the 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.

Teaching Positions

Teaching Assistant

Pilani, India

Neural Networks and Fuzzy Logic (BITS F312)

AUG 2022 - PRESENT

- Designing and conducting **course assignments** on various types of machine learning and deep learning models.
- **Conducting workshops** for teaching elementary concepts for programming neural networks.

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.

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

Extra-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.