

Atharva Chandak

FINAL YEAR UNDERGRAD AT BITS PILANI

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Education

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

BACHELOR OF ENGINEERING IN COMPUTER SCIENCE

Pilani, India

AUG 2019 - PRESENT

Research Experience

Airlab, Carnegie Mellon University

INTERN

SUPERVISOR: PROF. SEBASTIAN SCHERER

Pittsburgh, USA (Remote)

AUG 2022 - PRESENT

- 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 **real-time usage** on the drone capturing high resolution feed from multiple cameras.

Visual Computing Group, Harvard SEAS

VISITING UNDERGRADUATE RESEARCH INTERN

SUPERVISOR: PROF. HANSPETER PFISTER

Cambridge, USA (Remote)

JAN 2022 - PRESENT

- 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

RESEARCH INTERN

SUPERVISOR: PROF. SURESH SUNDARAM

Bangalore, India (Remote)

JUN 2021 - DEC 2021

- 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**.

Industry Experience

Wells Fargo

INTERN

SUPERVISOR: MR. RAJU RAJAM

Hyderabad, India (Remote)

MAY 2022 - JUL 2022

- Conceptualized and created an **end-to-end AI enabled speech chatbot** for answering user home lending queries.
- Integrated **speech-to-text** and **text-to-speech** APIs for allowing speech interaction with the bot.
- Implemented **NLP pipeline** for **intent and entity extraction** and achieved an **F1 scores** of **93.4%** and **83.5%**.
- Authored the **action server to process the user request** demands and **response curation** for replying back to user.

CSIR-CEERI

SUMMER INTERN

SUPERVISOR: DR. AMALIN PRINCE & MR. J SURIYA PRAKASH

Chennai, India (Remote)

MAY 2021 - AUG 2021

- 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.

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

Selected Projects

Light Invariant Action Recognition

SUPERVISOR: PROF. KAMLESH TIWARI

Pilani, India

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 RGB** as well as **infrared** videos.
- Achieved **state-of the-art on** four benchmark datasets - **ARID, HMDB51, UCF101, and InfAR**.

Advertisement Understanding

SUPERVISOR: PROF. POONAM GOYAL

Pilani, India

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

SUPERVISOR: PROF. KAMLESH TIWARI

Pilani, India

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

SUPERVISOR: DR. J. JENNIFER RANJANI

Pilani, India

JAN 2021 - APR 2021

- Analysed and implemented various Deep Learning techniques for image super resolution.
- Reviewed **traditional Deep CNN based approaches (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.

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

Teaching Positions

Teaching Assistant

NEURAL NETWORKS AND FUZZY LOGIC (BITS F312)

Pilani, India

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

RANK: TOP 20

e-Yantra IIT Bombay

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 within 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

RANK: 3RD

IEEE BITS Pilani Chapter

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.

Extracurricular Activity

ORGANIZATIONS

BITS-ACM Student Chapter

CORE TEAM MEMBER

Pilani, India

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.

ShARE BITS Pilani

SENIOR MEMBER

Pilani, India

JUL 2020 - JUL 2022

- **Prepared and delivered consulting presentations** on various topics related to technology such as blockchain, EVs, etc.
- Solved various corporate level problems while also **inculcating** the **“Do Well Do Good” ideology** of ShARE.
- **Interned at a startup (Catalytic Corps)** to build a framework to identify and **solve problems in Indian MSME sector**.

Volunteering

National Service Scheme(NSS) at BITS Pilani

VOLUNTEER

Pilani, India

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.
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