

Aditya Aggarwal

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EDUCATION

International Institute of Information Technology

Hyderabad, India

B. Tech (Honors) in Electronics and Communication Engineering (CGPA: 8.9 / 10)

2016 - 2020

PEER-REVIEWED PUBLICATIONS

- **Quo Vadis, Skeleton Action Recognition?**

P Gupta, A Thatipelli, **A Aggarwal**, S Maheshwari, N Trivedi, S Das and RK Sarvadevabhatla

Accepted at International Journal of Computer Vision (July 2021)

- **Reconstruct, Rasterize and Backprop: Dense shape and pose estimation from a single image**

A Pokale*, **A Aggarwal***, KM Jatavallabhula and KM Krishna

Accepted at CVPR-W on Long Term Visual Localization, Visual Odometry, and Learning-Based SLAM 2020

- **A principled formulation of integrating objects in Monocular SLAM**

A Pokale, D Das, **A Aggarwal**, B Bhowmick and KM Krishna

Accepted at International Conference on Advances in Robotics 2019

* indicates equal contribution

PATENTS

- **System and method for integrating objects in monocular slam**

A Pokale, D Das, **A Aggarwal**, B Bhowmick and KM Krishna

Filed by Tata Consultancy Services Limited

RESEARCH EXPERIENCE

- **Research Intern, Microsoft Research** Bangalore, India

February 2021 - Present

- Mentored by **Dr Mohit Jain** and **Dr Nipun Kwatra** at Technology and Empowerment Group on the intersection of computer vision, image processing. and machine learning in the healthcare domain.
- Developing end-to-end smartphone based system for creating low-cost diagnostic solution for eye diseases.

- **Undergraduate Researcher, CVIT Lab** IIIT Hyderabad

December 2018 - June 2020

- Worked with **Prof. Ravi Kiran Sarvadevabhatla** on Human Activity Recognition in *In the Wild* videos using 3D body and hand pose.
- Formulated an ensemble model for skeletal action recognition which achieved a state of the art accuracy of 88.80% (Cross Setup) and 87.22% (Cross Subject) on the NTU-120 dataset.
- Labelled and created a 3D-pose annotated dataset with open ended action vocabulary **Metaphorics**.

- **Undergraduate Researcher, Robotics Lab** IIIT Hyderabad

October 2018 - April 2020

- Guided by **Prof. Madhava Krishna** on the object-oriented SLAM with a monocular camera.
- Proposed a novel trajectory estimation pipeline by jointly optimizing for camera trajectory, 3D object shape and 6-DOF pose, to create semantically meaningful maps.
- Integrated an occupancy network with a differentiable renderer to backpropagate the loss for accurate pose estimation. Benchmarked the pipeline on synthetically rendered dataset in Blender.

- **Project Assistant, Visual Analytics Lab** IISc Bangalore

May 2019 - July 2019

- Worked with **Prof. R. Venkatesh Babu** on 3D Hand Pose and Shape Estimation from RGB images.
- Implemented an Adversarial Auto encoder to learn the pose embedding space for skeletal hand joints, conditioned via the discriminator in the encoded latent space.

WORK EXPERIENCE

- **Product Engineer, *Gojek*** Bangalore, India July 2020 - January 2021
 - Worked on the ride hailing platform (with more than 4 million daily orders) as a backend engineer to add on demand features and improve the customer booking experience.
 - Built a scheduler service in Go and Ruby to book rides in the future and integrated it with the database.
- **Teaching Assistant, IIIT Hyderabad** August 2019 - April 2020
 - Conducted tutorials, created and evaluated assignments and mentored students for final projects in the courses: **Computer Vision** (Spring 2020) and **Digital Image Processing** (Fall 2019).
- **Open Source Developer, *Google Summer of Code 2019*** Robocomp April 2019 - August 2019
 - Created a **People Identification System**, able to identify people from very few training images using Incremental and Few Shot Learning techniques for the educational bot.
- **Team Robocon, IIIT Hyderabad** August 2017 - February 2018
 - Designed and built an autonomous and a manual bot which coordinated together to pick a ball, navigate the playing field and throw the ball towards a fixed target.
 - Presented a demo at the annual **Research and Development Showcase 2018** at IIIT-H.

ACHIEVEMENTS

- Awarded the **Dean's Merit List** for excellent performance in academics (Top 5 % students).
- Ranked 24th at the **CANSAT 2018** organized by The American Astronautical Society (AAS).
- **All India Rank 2236** in **JEE Advanced 2016** (98.5% percentile among 150,000 students).
- **All India Rank 4198** in **JEE Mains 2016** (99.7% percentile among 1.2 million students).

SERVICE

- **Reviewer** BMVC (2021), ICPR (2020)
- Student mentor for the **Google Summer of Code** for Robocomp in 2020, 2021
- Mentored incoming students in Image Processing and Computer Vision at the CVIT orientation 2020.
- Served as the Head of **Robotics Club** at IIIT-H, handling the finances and logistics of the organized events.

SELECTED PROJECTS

- **Generative Adversarial Talking Head:** Implemented a DC GAN network in tensorflow which synthesized facial expressions of an arbitrary portrait with action units while maintaining facial geometry, skin color and the background.
- **Mini Dropbox:** Created a distributed file sharing protocol with a server and client using application layer protocol.
- **Sparse Reconstruction of 3D Object:** Made a system for reconstructing sparse set of points in the scene, given only 2 views using RANSAC Algorithm and Algebraic Triangulation. Later extended to reconstruction using multiple views.
- **Power Optimization for Full Adder:** Implemented a Multi Objective Simulated Annealing Algorithm in python to reduce power leakage in a full adder circuit by 50 % keeping the delays in bound.

TECHNICAL SKILLS

- **Languages:** Python, C++, Golang, Ruby, Matlab, Java
- **Machine Learning Frameworks:** PyTorch, TensorFlow, Keras

RELEVANT COURSEWORK

- **Artificial Intelligence:** Computer Vision, Optimization Methods, Statistical Methods in AI, Mobile Robotics
- **Mathematics:** Differential Equations, Probability and Random Processes, Linear Algebra, Discrete Structures
- **Systems:** Operating Systems, Advanced Communication Networks, Computer System Organization
- **Algorithms:** Algorithms and Data Structures, C Programming