Aditya Aggarwal

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Education

International Institute of Information Technology, Hyderabad Hyderabad, India
B.Tech with Honors in ECE 2016 - 2020

- Advisor: Prof. K. Madhava Krishna
- Dean's List (Monsoon 2016, Spring 2017, Monsoon 2017, Monsoon 2018, Spring 2019)
- CGPA: **8.95 / 10**

Peer-Reviewed Publications

P. Gupta, A. Thatipelli, **A. Aggarwal**, S. Maheshwari, N. Trivedi, S. Das, and R. K. Sarvadevabhatla. **Quo Vadis, Skeleton Action Recognition?** International Journal of Computer Vision 129(7), 2097–2112.

A. Pokale*, **A. Aggarwal***, K. M. Jatavallabhula and K. Madhava Krishna, **Reconstruct, Rasterize and Backprop: Dense shape and pose estimation from a single image**, 2020 IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (CVPRW), 2020, pp. 179-186.

A. Pokale, D. Das, **A. Aggarwal**, B. Bhowmick, and K. Madhava Krishna. **A principled formulation of integrating objects in Monocular SLAM**. In Proceedings of the Advances in Robotics 2019 (AIR 2019). Association for Computing Machinery, New York, NY, USA, Article 54, 1–6.

** indicates equal contribution*

Research Experience

Microsoft Research, India - *Research Intern* February 2021 - Present

- Advisors: Dr. Mohit Jain, Dr. Nipun Kwatra
- Developed a smartphone based system for estimating refractive error of the eye in collaboration with Sankara Eye Hospital, Bangalore. Conducted a successful pilot clinical trial with 250 patients.
- Proposed an image processing pipeline to localize retinoscopic beam and reflex in constraint settings.

CVIT Lab, IIIT Hyderabad - *Undergraduate Researcher* December 2018 - June 2020

- Advisor: Prof. Ravi Kiran Sarvadevabhatla
- Worked on Human Activity Recognition using 3D body and hand pose, achieved state-of-the-art accuracy of 88.80% on the NTU-120 dataset. Published at IJCV 2021. [project page, video]
- Labelled and created 3D-pose annotated skeletal action recognition dataset with over 125,000 videos.

Robotics Lab, IIIT Hyderabad - *Undergraduate Researcher* October 2018 - April 2020

- Advisor: Prof. K. Madhava Krishna
- Integrated an occupancy network with a differentiable renderer for 3D mesh and 6D pose estimation from monocular images. Published at CVPR-W 2020. [code, video]
- Proposed novel trajectory estimation pipeline which jointly optimized camera track, object's shape and camera pose. Published at AIR 2019.

Visual Analytics Lab, IISc Bangalore - *Project Assistant* May 2019 - July 2019

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

Work Experience

Gojek, India - *Product Engineer* July 2020 - January 2021

- Worked on the ride hailing platform (with more than 4 million daily orders) as a backend developer to improve the customer booking experience by adding on demand features.
- Built a scheduler service in Golang to book rides in the future and integrated it with the database.

Robocomp, Google Summer of Code 2019 - *Open Source Developer* April 2019 - August 2019

- Advisor: Prof. Pilar Bachiller
- 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.

Teaching and Advising

Robocomp, Google Summer of Code - *Mentor* 2020 - 2021

- Guided students on the Sign-Language Recognition and Human re-identification modules.
- Responsible for evaluating applications, reviewing code and establishing timelines and deliverables.

IIIT Hyderabad - *Teaching Assistant*

- Computer Vision (Spring 2020), Digital Image Processing (Monsoon 2019)
- Responsible for taking regular tutorials, creating and evaluating assignments, grading answer scripts, and mentoring students for the final course projects.

Selected Projects

- **Mosquitoes vs Drones** March 2019

  Developed a color segmentation pipeline to identify the water logged areas in aerial images. Implemented a path planning algorithm for drone to reach the predicted location. [code, video]

- **Generative Adversarial Talking Head** Feb 2019 - April 2019

  Implemented a DC GAN network in tensorflow which synthesized facial expressions of an arbitrary portrait while preserving facial geometry, skin color and the background.

- **Unsupervised 3D Keypoint Estimation** August 2018 - December 2018

  Reproduced the results from NeurIPS 2018 paper "Discovery of Latent 3D Keypoints via End-to-end Geometric Reasoning" (link) and extended it to work on real images by retraining the model with rendered objects on random backgrounds.

- **CanSat 2018** February 2018 - June 2018

  Designed and prototyped the sensor and power subsystem of a space probe simulating the satellite launch, parachute deployment, payload descent and landing. [code, video]

- **ABU Robocon 2018** 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. [code, video]

Technical Skills

- **Languages**: Python, C/C++, Matlab, Golang, Ruby, Java
- **Machine Learning Frameworks**: PyTorch, TensorFlow, Keras
- **Tools and Frameworks**: Android-SDK, Bash, Linux, LaTeX

Academic Services

- **Reviewer**: BMVC (2021), ICPR (2020)
- **Volunteer**: ICVGIP 2018