Aditya Aggarwal

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Education

- **University of California, San Diego** — San Diego, California
  Masters of Science in Computer Science & Engineering — June 2024 (Expected)
- **International Institute of Information Technology** — Hyderabad, India
  Bachelor of Technology (Honors) in Electronics & Communication Engineering **(CGPA: 8.9 / 10)** — June 2020

Work Experience

- **Research Intern, *Microsoft Research*** Bangalore, India — February 2021 - August 2022
  - Pursued research on the intersection of computer vision, machine learning and HCI in the healthcare domain under the mentorship of **Dr Mohit Jain** and **Dr Nipun Kwatra** at Technology and Empowerment (TEM) group.
  - Developed a **mobile application** and a **video processing pipeline**, which tracks retinal reflex and retinoscopic beam to estimate the refractive error of human eye in smartphone videos without manual intervention.
  - Led a clinical evaluation on 128 patients and achieved a MAE of $0.75 \pm 0.67D$. [project page, code]
- **Product Engineer, *Gojek*** Bangalore, India — July 2020 - January 2021
  - Worked on the ride hailing platform (serving 4M+ daily users) in the Transport vertical as a backend engineer to add on demand features and improve the customer booking experience. (Tech Stack: Golang, Ruby, Kafka, PostgreSQL)
  - Built a **scheduling microservice** with job execution and retry support, that allowed users to book rides in the future, thus increasing the Booking Conversion Rate (BCR) from 90% to 95%.
- **Undergraduate Researcher, *CVIT Lab*** IIIT Hyderabad — December 2018 - June 2020
  - Worked on Human Activity Recognition in *In the Wild* videos using 3D body and hand pose. [project page]
  - Formulated an average pooled graph convolution 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.
  - Created a 3D-pose annotated skeletal action recognition dataset with over 125,000 *In the Wild* videos.
- **Open Source Developer, *Google Summer of Code (GSoC)*** Robocomp — April 2019 - August 2019
  - Implemented a **People Identification System**, able to identify people from very few images by training a Siamese neural network and minimizing euclidean distance in feature embedding space.

Publications

- **Towards Automating Retinoscopy for Refractive Error Diagnosis** - IMWUT, September 2022
- **Quo Vadis, Skeleton Action Recognition?** - IJCV, July 2021
- **Reconstruct, Rasterize and Backprop: Dense shape & pose estimation from a single image** - CVPRW 2020
- **A principled formulation of integrating objects in Monocular SLAM** - AIR 2019

Projects

- **Generative Adversarial Talking Head**: Implemented a DC GAN network in tensorflow which synthesized facial expressions of an arbitrary portrait while preserving facial geometry, skin color and the background.
- **3D Shape and Pose Estimation**: Integrated a neural network with differentiable renderer to backpropagate the loss for shape and pose estimation in monocular videos. Benchmarked it on synthetically rendered dataset in Blender. [code]
- **Mini dropbox**: Created a distributed file sharing system with server and client using application layer protocol. [code]
- **Mosquitoes vs Drones**: Built a color segmentation pipeline to identify the water logged areas in aerial images. Coded a path planning algorithm for drone to reach the predicted locations. [code, video]
- **Game of Life**: Implemented a zero-player game in java & ruby following MVC architecture and TDD paradigm. [code]

Achievements

- Mentored students for the GSoC 2020, 2021 under Robocomp org. for computer vision and machine learning projects.
- Awarded the **Dean's Merit List** for excellent performance in academics for 5 semesters (Top 5 % students).
- Ranked 24th at the CANSAT 2018 organized by The American Astronautical Society (AAS).

Technical Skills

- **Languages and Tools**: Python, C++, Golang, Ruby
- **Machine Learning**: PyTorch, TensorFlow, OpenCV