Jamal Ahmed **Rahim**

🏠 jrahim.github.io | in rahimj

Publications

SAgA-NeRF: Subject-Agnostic and Animatable Neural Radiance Fields for Human Avatar   *MSc Thesis*

- Proposed and presented the **first-ever method** that can reconstruct a given human from sparse camera views in any novel pose and any novel camera view. Our work was built using **Python, OpenCV, Open3D, and PyTorch**.
- Our method performed at par with novel pose methods for novel pose reconstruction, and novel camera-view methods for novel camera-view reconstruction, while having the ability to perform both, which is very complex to accomplish.

End-to-End Rotation Averaging with Multi-Source Propagation   *CVPR 2021*

Luwei Yang, Heng Li, Jamal Ahmed Rahim, Zhaopeng Cui, Ping Tan   *Jun. 2021*

- Developed a **state-of-the-art** end-to-end neural network for multiple rotation averaging in SfM (Structure from Motion), the widely used pipeline for 3D reconstruction. Our work was built using **Python, OpenCV, Open3D, and PyTorch**.
- This work was a **huge accomplishment** in the field of 3D reconstruction, being the **first-ever** machine-learning based method to consistently produce high quality and reliable results. It **outperformed existing methods on 25 out of 28 datasets**, and produced reliable results on scenes where other methods would outright fail or produce unusable results.
- Improvement over other methods ranged from **50% to 600%** depending on the scene.

Deep Facial Non-Rigid Multi-View Stereo   *CVPR 2020*

Ziqian Bai, Zhaopeng Cui, Jamal Ahmed Rahim, Xiaoming Liu, Ping Tan   *Jun. 2020*

- Presented a **novel, state-of-the-art method** for 3D face reconstruction from multi-view images with different expressions. Project was built on **Python, OpenCV, Open3D, and PyTorch**.
- Outperformed existing state-of-the-art methods for both, reconstruction from a single view image, as well as reconstruction from multi-view images, using appropriate comparison metrics, on average by **40%**.

Colored Transparent Object Matting from a Single Image Using Deep Learning   *arXiv*

Jamal Ahmed Rahim, Kwan-Yee Kenneth Wong   *Dec. 2018*

- Research performed as part of a **prestigious** program I was awarded, the Undergraduate Research Fellowship Programme at HKU.
- Created the **first-ever** machine-learning based method to be able to extract colored transparent objects by predicting their color mask, filter, and most importantly, a refractive flow. The object could then be recreated in any new image.
- Built and organized synthetic and real datasets from scratch, as well as an appropriate Convolutional Neural Network, using **Lua and Torch**.
- Research was also carried on to my final year project and won the **best final year project award**.

Work Experience

Deep Learning Engineer   *Canada*

DaoAI Robotics   *Jan. 2023 - Apr. 2023*

- DaoAI needed specialized tools to determine 3D positions of objects on conveyer belts using stereo cameras, and to estimate their 6D poses, so that a manufacturing robot can be guided to the correct 3D space with the "hands" in the correct orientation to grab the object.
- I re-implemented well-known stereo matching and object pose estimation methods. I collected datasets, fine-tuned the machine learning models, and re-created **state-of-the-art** results from the respective publications. The tools used were **Python, OpenCV, Open3D, and PyTorch**.
- These essential tools could then be offered to clients as needed, helping speed up and automate more of the manufacturing processes.

Teaching Assistant   *Canada*

Simon Fraser University   *May. 2020 - Aug. 2022*

- CMPT115: Exploring Comp Sci (x2), CMPT125: Intro to Comp Sci and Programming II (x2), and CMPT120: Intro to Comp Sci and Programming I.

Undergraduate Research Fellow   *Hong Kong*

The University of Hong Kong   *Apr. 2018 - Jun. 2019*

- Conducted Computer Vision research as part of the prestigious Undergraduate Research Fellowship Programme at HKU. (See Publications).

Research Assistant   *Hong Kong*

The University of Hong Kong   *Oct. 2016 - Dec. 2018*

- Worked with Dr. Zheng Qu to implement, test and compare performances of different algorithms for the Markov Decision Problem.
- Worked with Dr. Chui Chun Kit to prepare a workshop for programming a drone from scratch using an Arduino board.

Education

Simon Fraser University   *Canada*

MSc in Computing Science   *Sep. 2019 - Aug. 2022*

- CGPA: 3.87

The University of Hong Kong   *Hong Kong*

BEng(CompSc)   *Sep. 2015 - May 2019*

- CGPA: 3.77 (First Class Honors)

Technical Skills

- **Programming Languages**: Python, Java, C++/C, HTML/CSS, SQL, MATLAB
- **Frameworks and Developer Tools**: PyTorch, TensorFlow, OpenCV, NumPy, Django on Python, Figma, Github, Windows, Linux, PowerShell