Niraj Mahajan

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EDUCATION

University of California San Diego | **GPA: 3.95/4** — La Jolla, CA
Master of Science in Computer Science (with Thesis) — Sept 2022 – June 2024
- Courses: Deep Generative Models, Advanced Computer Vision, Recommender Systems & Web Mining

Indian Institute of Technology Bombay | **GPA: 9.33/10** — Mumbai, India
Bachelor of Technology with Honors, Major: Computer Science and Engineering — Jul 2018 – May 2022
- Activities: Teaching Assistant (Computer Vision: Theory and Lab, Digital Image Processing), CSEA General Secretary
- Courses: Medical Vision, Computer Vision, Reinforcement Learning, Image Processing, Fairness in ML, AI, ML with Graphs

EXPERIENCE

University of California San Diego | Graduate Student Researcher — **October 22 - Ongoing**
- Achieved a 200+ FPS for Cine MRI reconstruction from severely undersampled Fourier data using an LSTM pipeline.
- Enhance the reconstruction using the periodicity of Cine MRI and deploy the architecture in an MRI Scanner for real-time testing

University of Illinois Urbana-Champaign | Research Intern — **July 20 – April 21**
- Improved FC layer explainability by using Gaussian clustering on convolutional outputs without sacrificing accuracy
- Developed a novel classification algorithm based on shifting and shrinking class clusters as trainable parameters in the conv-space

University of New South Wales, Canberra | Research Intern — **April 20 – July 20**
- Predicting the 3D registration parameters for synthetically generated femur images using a ResNet in a Siamese network
- Performed soft tissue removal on clinical knee CT scan images with the help of a half dark channel filter algorithm

Papers

Temporally-Aware Neural Networks For Cine MRI Reconstruction From Severely Undersampled Data
ISMRM 2024 (under review): Mahajan, Rodriguez-Soto, Chung, et al. (5 others)

Real-time automated assessment of image quality during MRI scanning for optimal image reconstruction
ISMRM 2024 (under review): Buckup, Mahajan, Rodriguez-Soto, Contijoch)

Closed-loop CMR acquisition improves 3D k-space acquisition and image quality during cardio-respiratory navigation
ISMRM 2024 (under review): Rodriguez-Soto, Mahajan, Schuchardt, et al. (3 others)

KEY TECHNICAL PROJECTS

DreamBooth-Fusion For Personalised Text To 3D — **Spring 2023**
- Rendered a NERF-based 3D model of a personalised image in a text-controlled context generated using a stable diffusion network

FFT Based Video Frame Interpolation — **Fall 2022**
- Employed an encoder-decoder convGRU sequence for VFI and integrated a Fourier domain loss to improve edge preservation

RNNs for Artefact Removal in 3D MRI scans — **Spring 2022**
- Introduced motion artifacts to 3D MRI scans through k-space data distortion and successfully mitigated them using convLSTMs

Deep Retinex Decomposition for Low-Light Enhancement — **Fall 2021**
- Performed low light enhancement by using CNNs to enhance the reflectance and illumination components of images individually

Conditional Diabetic Retinopathy Image Synthesis — **Spring 2021**
- Engineered a two-stage Pix2Pix pipeline for vessel segmentation and grade-conditioned retinopathy synthesis

Location Controlled Brain Tumour Image Synthesis — **Spring 2021**
- Generated a location-controlled brain tumour dataset using in-painting and trained a controllable GAN for image synthesis

Face Ageing using GANs — **Spring 2020**
- Implemented two-way facial age transformation using a conditional GAN, trained with an AlexNet-based age classifier

TECHNICAL SKILLS

Languages	*(Fluent)* Python, Git, Matlab, *(Familiar)* C++, SQL, Bash, Java, C, HTML/CSS, JavaScript, Make
Libraries	PyTorch, OpenCV, scikit-learn, Scipy, NumPy, Pandas, Matplotlib, Keras, TensorFlow