MUKUNDAN CHARIAR

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EDUCATION

Carnegie Mellon University Pittsburgh, PA
Master of Science in Mechanical Engineering - Research May 2025

- Selected Courses: 24-678 ST: Computer Vision for Engineers (F23), 11-785 Introduction to Deep Learning (S24), 24-703 Numerical Methods in Engineering (F24), 24-760 Robot Dynamics and Analysis (F24).

Manipal Institute of Technology Manipal, India
Batchelor of Technology in Mechatronics June 2023

- Selected Courses: Machine Vision and Image Processing, Machine Learning, Digital Signal Processing, Robotics I, Linear Control Theory, Linear Integrated Control Analysis.

PROJECTS

Advancing Interpretability in AI: An Implementation of Neural-Symbolic Visual Question Answering May 2024
Carnegie Mellon University Pittsburgh, PA

- Created a Visual Question Answering framework based on transformer based deep learning. VQA was performed on state of the art bench-marking datasets such as Neural-Symbolic VQA. Framework achieved an accuracy of 70.5% on the dataset. This was a project in partial fulfillment of 11-785 IDL (S24).

Instant3D: Revolutionizing Reconstruction with AI December 2023
Carnegie Mellon University Pittsburgh, PA

- Designed a 3D reconstruction pipeline based on Structure from Motion. Results were compared to Neural Radiant Field based reconstructions. This was a project in partial fulfillment of 24-678 ST:CVE (F23).

Machine Learning for Squat Analysis and Correction June 2023
Manipal Institute of Technology Manipal, India

- Collaborated with fellow students to design an Autoencoder based model that classified squats into seven types.
- Wrote code that processed videos of people doing squats, converting them into pose data utilizing MediaPipe Pose and analysed them with machine learning techniques. The result was a stacked Bi-GRU with Attention layer, which gave an accuracy of 94.00%.
- A paper titled 'AI Trainer: Autoencoder Based Approach for Squat Analysis and Correction' was submitted to IEEE Access. The published paper can be found here: 10.1109/ACCESS.2023.33160090.

Bio Inspired Designs December 2022
Manipal Institute of Technology Manipal, India

- Designed 3D models of Bio-Inspired structures such as the honeycomb structure and rhombic dodecahedrons using Fusion 360, in collaboration with a classmate.
- Fabricated 3D prints of these structures, which were stress tested by another group.

TEACHING ASSISTANT EXPERIENCE

24-679 ST: Computer Vision for Engineers (F24) August 2024-Present
Course Assistant Pittsburgh, PA

- Held office hours, proctored and graded quizzes, graded homeworks, providing detailed feedback for students on improving the quality of their submissions for a class of 60 students.

EXPERIENCE

Rex Engineering and Metal Works June-July 2022
Floor Intern Thane, India

- Studied operations on CNC machines, helped inspect completed jobs, created models, generated g-codes for jobs using Fusion 360, AutoCAD and MasterCam Mill 9.
- Fabricated a CNC milled tray under the supervision of engineers.

SKILLS

Programming Languages: Python, Java, C, C++, Embedded C, Assembly, SQL, Matlab
Application Software: Fusion 360, MakerBot Print, Matlab Simulink
Languages: English (Fluent), Hindi (Native Speaker), Marathi (Native Speaker)

LEADERSHIP

Vice President June 2021 - September 2022
IE Mechatronics Students' Chapter, Manipal Manipal Institute of Technology

- Organized multiple events, coordinated over projects and mini projects, volunteered for collaboration with other student clubs, organized and budgeted the funds for the club and the projects under the club, held recruitment sessions, etc.
- Managed executive board of 3 members and ran weekly meetings to oversee progress in essential parts of the chapter.
- Led chapter of 120+ members to work towards goals that improve and promote community service, academics, and unity.