# MUKUNDAN CHARIAR

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## EDUCATION

**Carnegie Mellon University** *Pittsburgh, PA*
Master of Science in Mechanical Engineering *May 2025*
• Selected Courses: Introduction to Deep Learning, ST - Computer Vision for Engineers.

**Manipal Institute of Technology** *Manipal, India*
Bachelor of Technology in Mechatronics *June 2023*
• Selected Courses: Machine Vision and Image Processing, Machine Learning.

## SKILLS

Programming Languages: Python, Java, C, C++, Embedded C, Assembly, SQL, Matlab, Julia.
Libraries: PyTorch, NumPy, Pandas, OpenCV, Jax, MuJoCo.
Application Software: Fusion 360, MakerBot Print, Matlab Simulink.

## PROJECTS

Physical-Therapy Assessment with Uncalibrated Cameras and Inertial Sensors *June 2023 - December 2024*
Carnegie Mellon University: Research Project *Pittsburgh, PA*
• Optimized the fitting of a graphical body model to noisy body keypoints and inertial measurement unit orientations.
• Extracted body segment orientations from body models and applied machine learning to detect exercise errors with 72.3% accuracy.
• Developed a heuristic to classify exercise errors using body segment orientations, achieving 55.5% accuracy.

Instant3D: Revolutionizing Reconstruction with AI *August 2023 - December 2023*
Carnegie Mellon University: Course project *Pittsburgh, PA*
• Built a 3D reconstruction pipeline based on Structure from Motion in collaboration with fellow students. Results were compared to Neural Radiant Field based reconstructions.

Machine Learning for Squat Analysis and Correction *January 2023 - June 2023*
Manipal Institute of Technology: Research Project *Manipal, India*
• Collaborated with fellow students to collect data of volunteers doing squats. Obtained joint locations using pose estimation.
• Created a neural network to classify collected data, reaching an accuracy of 94.0%.
• Published paper titled 'AI Trainer: Autoencoder Based Approach for Squat Analysis and Correction'. DOI: 10.1109/ACCESS.2023.33160090.

Bio Inspired Designs *May 2022 - December 2022*
Manipal Institute of Technology: Research Project *Manipal, India*
• Designed 3D models of Bio-Inspired structures such as honeycombs and rhombic dodecahedrons using Fusion 360, in collaboration with a classmate.
• Fabricated 3D-printed structures and incorporated an internal structure, enhancing filament usage efficiency by 61.2%.

## EXPERIENCE

24-703 Numerical Methods in Engineering *Carnegie Mellon University, Pittsburgh, PA*
Course Assistant *January 2025 - May 2025*
• Conducted office hours and recitations with a group of course assistants, proctored and graded exams, graded homeworks, supported students to improve the quality of submissions for a class of 30 students.

24-678 ST: Computer Vision for Engineers *Carnegie Mellon University, Pittsburgh, PA*
Course Assistant *August 2024 - December 2024*
• Held office hours, proctored and graded quizzes, graded homework, provided detailed feedback for students on improving the quality of submissions for a class of 60 students as part of a group of course assistants.

Rex Engineering and Metal Works *Thane, India*
Floor Intern *June 2022 - July 2022*
• 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 supervision of senior engineers.

## LEADERSHIP

Vice President *June 2021 - September 2022*
Institution of Engineers, Mechatronics Students' Chapter, Manipal *Manipal, India*
• Organized multiple events, coordinated over projects and mini projects, volunteered for collaboration with other student clubs, organized and budgeted funds for the club and projects under the club, held recruitment sessions, etc.
• Managed a board of 8 members and ran weekly meetings to oversee progress in essential parts of the chapter.
• Led chapter of 120+ members to work towards goals that promote community service, academics, and unity.