Omkar Chittar

(301) 526-5726 | omkar.chittar@gmail.com | omkarchittar.com | linkedin | github

Work Experience

Radical AI New York (Remote)

Artificial Intelligence Intern *Feb. 2024 – Present*

- Leveraged deep learning models from **OpenAI** and **Google Cloud Platform** using APIs to develop an AI Coach, enhancing career development and increasing user engagement by **40%**
- Engineered an **open-source** tool leveraging **VertexAI**, **Langchain**, **React** and **FastAPI** to analyze and distill YouTube transcripts, transforming digital learning by condensing extensive educational videos into accessible key concepts, markedly enhancing study efficiency and instructional methods
- Collaborated on the **AutoGrade** project by benchmarking state-of-the-art LLMs for grading code submissions, which improved grading accuracy by **30%** and reduced manual review needs
- Created API endpoints using **FastAPI** for code file submissions, and handled errors and edge cases efficiently; improved system reliability and reduced response time by **25%** through **Docker**-based dependency management

Sakar Robotics Pune, India

Computer Vision Engineer *July 2019 – June 2022*

- Implemented **NeRF** for **synthesizing novel views** of construction sites, enabling high-fidelity volumetric analysis, lowering manual inspection requirements and improving project tracking accuracy by **15%**
- Led the development of a **3D face reconstruction** system for surveillance using **deep Structure from Motion** and facial keypoint detection, improving surveillance capabilities whilst lowering man-power and saving **$10000** yearly
- Designed a system for robotic navigation by integrating **U-Net** architecture for precise **semantic segmentation** and **YOLO** for **object detection**, resulting in a **40%** improvement in object recognition and path planning capabilities
- Enhanced localization capabilities of a mobile robot by integrating **Normal Distribution Transform** & fusing **GPS/IMU** data with **Kalman filters**, increasing mapping precision by **20%** and a **50%** gain in efficiency; conducted research to refine odometry processes for enhanced sensor-based localization
- Implemented **PointNET** architecture for classification and segmentation of point clouds from **LiDAR** sensor mounted on a mobile robot, achieving **97%** accuracy for classification and **90%** for segmentation
- Trained a **7-DOF** robotic arm using **Reinforcement Learning** for a pick-and-place task by leveraging **DDPG** algorithm and **Hindsight Experience Replay** technique, resulting in a **30%** improvement in precision
- Enhanced localization capabilities of the mobile robot by integrating **Normal Distribution Transform** & fusing **GPS/IMU** data with **Kalman filters**, increasing mapping precision by **20%** and a **50%** gain in operational efficiency; conducted research to refine odometry processes for enhanced sensor-based localization
- Streamlined data workflow and model training, enhancing data/image acquisition via **ROS** APIs, and boosting training speed by **20%** and policy rollout by **35%** through strategic **CUDA** optimization and **SLURM** scheduling
- Partnered with cross-functional teams to integrate software modules for a robotic arm, resulting in a **30%** reduction in development time and improved overall system performance
- Coordinated with software engineering and product teams to transition models from **PyTorch** to production environments in **C++** using **libtorch** and **Docker**, significantly enhancing operational efficiency and scalability
- Managed the full software development life-cycle of a robotic system, using **Agile** methodologies & pair-programming with object-oriented design patterns and rigorous unit testing to ensure system robustness & maintainability

Defence Research and Development Organisation Pune, India

Robotics Trainee Engineer *July 2018 – July 2019*

- Innovated an **active exoskeleton** system for assisting humans while lifting heavy loads, achieving **95%** gait prediction accuracy with **PoseNet** and **LSTM** networks, enhancing load support capabilities by **30%**
- Integrated the orientation and odometry information from **IMU** and **2D LIDAR** scans to build occupancy grid map of the environment by updating the log odds while simultaneously performing **particle filter** based localization
- Deployed **Model Predictive Control** on 7 DoF manipulator arm to plan collision-free trajectories in an obstacle cluttered environment, leading to a **15%** reduction in response time and improved system stability
- Devised **LQG** and **LQR** control by linearizing the dynamic model of a crane carrying suspended masses to minimize the oscillations & control effort; used **Kalman filter** to account for Gaussian noise in the sensor measurements
- Performed image segmentation using **superpixels** generated with **SLIC** algorithm, resulting in **95%** accuracy
- Employed **Siamese neural network** for face recognition utilizing **TensorFlow** and **One-Shot Learning**
- Devised localization methods for deep **few-shot** vision models, improving accuracy on **densely-annotated** datasets
- Successfully trained and deployed **CycleGAN** for image-to-image translation; achieved **0.25 mAP** increase in the cross-domain **object detection** performance over baseline
- Implemented **Search-based algorithms** like BFS, DFS, Dijkstra, A*, and **Sampling-based algorithms** like RRT, RRT* and bi-RRT on holonomic and non-holonomic robots

Education

University of Maryland — College Park , MD
Master of Engineering in Robotics & AI — 3.96 CGPA — *Aug. 2022 – May 2024*

Pune University — Pune, India
Bachelor of Engineering in Mechanical — *July 2014 – June 2018*

Skills

Languages: Python, C/C++, MATLAB, SQL, HTML, CSS, JavaScript, R
Tools: CUDA, TensorRT, Git, Docker, GCP, Linux, ROS, OpenVINO, ONNX, Carla, AWS, Azure, VertexAI, Gazebo
Libraries: pandas, NumPy, Matplotlib, PyTorch, TensorFlow, Keras, scikit-learn, OpenCV, PCL, PIL, OpenGL
Expertise: Motion Planning, Robot Perception, Robot Control, Reinforcement learning, SLAM, SolidWorks, CNN, RNN, GANs, GenAI, Linear Algebra, Calculus, Probability, Statistics, 3D reconst, NLP, LLMs, RAG

Publications

Chittar. O. A., Dr. Barve. S. B. Waist-Supportive Exoskeletons: Systems and Materials. Paper, MATPR 2022
Chittar et al. Experimental investigations on waist supportive passive exoskeletons. Paper, MATPR 2022

Leadership Experience

Recruitment & Retention Manager at the Department of Transportation Services, University of Maryland.
Proprietor and Teacher at SAI Classes, an educational institute for mathematics and computer science in Pune, India.