

Chandramouli Rajagopalan

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EDUCATION

University of California, San Diego Master of Science – Intelligent Systems, Robotics and Control	Sept 2022 - June 2024 3.78 / 4.0 GPA
National Institute of Technology, Warangal Bachelor of Technology – Electronics and Electrical Engineering	July 2015 - May 2019

WORK EXPERIENCE

❖ K-Scale Labs Open Source Robotics Researcher	San Diego, CA August 2024 – Present
- Trained a world model to successfully learn dynamic walking tasks on a humanoid robot (StompyPro), and further utilized collected samples to develop Vision-Language-Action (VLA) model optimized for real-time control on edge devices. - Engineered a pipeline to transfer real-world motion data from humans to humanoid robots via pose-transfer techniques, enabling humanoid robots to mimic human movements in real-time scenarios. - Implementing a real-time human-to-humanoid teleoperation system using pose transfer and Imitation learning and later training a model-based RL to achieve a robust model, facilitating data collection from teleoperated tasks and advancing the humanoid's adaptive learning capabilities in real-world environments.	
❖ FrontiersMarket Machine Learning Engineer - CoOp	San Diego, CA April 2024 – Present
- Developed a multimodal learning setup for cattle recognition using a single multi-task learning framework incorporating depth, normal, segmentation, keypoint, and image data to enhance cattle identification. - Developed and optimized face recognition system for cattle identification, significantly improving identification accuracy across cameras and across time from 10% to 60% using CLIP based (text and vision) technique on a combination of unlabelled and labelled video dataset. - Built and deployed a comprehensive pipeline for real-time animal monitoring, incorporating cattle body, face, and eartag detection with end-to-end OCR integration. Achieved a 25 fps processing rate by optimizing various parts of the code (preprocessing, batched inference, tensorrt model inference) using PyTorch Profiler. - Minimized manual data-labeling and enhanced dataset quality by automating video data labeling for training reinforcement learning models by integrating open-source models (Florence2, SAM2.1, Llama 3.2) for large-scale video frame annotation (10M frames daily).	
❖ Dr.Xiaolong Wang's Lab - UC San Diego Graduate Research Assistant	San Diego, CA Sept 2022 – August 2024
- Enhanced the accuracy of a real-world robotic arm in dynamic environments by 30% and improved sample efficiency by ~40%, enabling the robot to effectively solve previously unseen tasks - Lead efforts around <u>transfer-learning</u> and <u>fine-tuning model-based algorithms</u> using sparse-rewards from real-world robotic arm demos collected using Offline Reinforcement Learning. Prevented over-estimation of state-values in Offline Reinforcement Learning by bridging the distribution gap between offline and online settings. - Designed and implemented 10+ additional tasks to mimic the robotic arm to cover large scenarios that capture the nuances of its movement in the real world on a private simulator environment based on OpenAI gym and Mujoco. - Developed and deployed diffusion policies in imitation learning, utilizing diffusion models to enhance policy generation and execution in grasping and bimanual manipulation tasks.	
❖ Streamingo Solutions Deep Learning Engineer	Bangalore, India July 2021 – July 2022
- Deployed a real-time multi-model pipeline for image detection, classification, and segmentation on AWS and NVIDIA Jetson edge devices, reducing model size from 500M to 23M for efficient edge deployment, and achieving tracking of ~100 objects at 20 images/second in occluded environments. - Improved object re-identification in streaming video by optimizing frame sampling, noise filtering, and memory allocation, and developed a pipeline using vector search and self-supervised learning for enhanced accuracy and range. Trained a Spatio-Temporal Action Recognition Transformer on real-world videos, and fine-tuned it for sports action recognition. Additionally, created an automated testing pipeline with Pytest to streamline model evaluation.	
❖ Endovision AI Computer Vision Data Scientist	Delhi, India April 2020 – June 2021
- Increased the coverage of endoscopic procedures of the stomach to 60% through <u>3D Scene Mapping</u> of GI tract using RGBD images. Performed calibration of the endoscopy camera and artifact filtering using classical <u>CV techniques</u>. - Minimized false positive rates by 75% by developing a verification algorithm on <u>Google Cloud</u> utilizing temporal-sequence classification techniques based on Deep Reinforcement Learning and Graph Networks.	
❖ Cerenaut Computer Vision Researcher	Chennai, India November 2021 – September 2022
- Designed a novel RL architecture that combines the benefits of model-based and model-free RL. Inspired by the brain, with a world model representing the Frontal Cortex, gated by a model-free algorithm representing the Basal Ganglia to improve the memory length of the world model. - Implemented Bicameral networks that have specialized hemispheres for enhanced classification.	

PUBLICATIONS

Finetuning Offline World Models in the Real World.	<i>Oral - Conference on Robot Learning (CoRL) 2023</i>
Deep Learning in a Bilateral Brain With Hemispheric Specialization.	<i>Springer LNCS 2024 (ACAIN 2024)</i>
Universal Domain Adaptation to Improve Performance on Out-of-Distribution Data.	<i>PMLR 2021 (NeurIPS 2021)</i>
PROJECTS: Depth and Motion Planning Using Monocular Camera in Dynamic Scenes, Visual Inertial SLAM and ParticleFilter SLAM , DifferentialMPC	
SKILLS: Python, CUDA/C++, Bash, IsaacGym/Gym, PyTorch, TensorFlow, TensorRT, Docker, Ray, Huggingface.	