

ANANTH JONNAVITTULA

Blacksburg, VA

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Education

Virginia Tech

PhD in Mechanical Engineering

Aug 2020 – Present

Blacksburg, VA

Worcester Polytechnic Institute

MS in Robotics Engineering

Aug 2015 – May 2017

Worcester, MA

SASTRA University

B.Tech in Electronics and Instrumentation Engineering

Jun 2011 – May 2015

Tanjore, India

Research Experience

Graduate Research Assistant

Institute: Virginia Tech

Aug 2020 – Present

Advisor: Prof. Dylan Losey

- Developed a method that can learn long horizon tasks from a single video demonstration from a human
- Developed inverse reinforcement learning based algorithm to learn from imperfect user demonstrations
- Developed a variational autoencoder based algorithm for imitation learning from user demonstrations
- Conducted stability analysis for imitation learning methods in the context of shared autonomy

Research and Development Intern

Company: ABB Inc

Jun 2022 – Aug 2022

Advisor: Harshavardhan Reddy

- Implemented and analyzed methods that use stereo vision or RGBD images for instance segmentation
- Developed instance segmentation algorithm for small parcels singulation using detectron2
- Developed BlenderProc based pipeline to generate synthetic datasets for training models
- Developed pipeline to export trained models from Python to C++ using Torchscript
- Deployed instance segmentation models on production ready ABB robots

Graduate Research Assistant

Institute: Worcester Polytechnic Institute

Jan 2016 – May 2016

Advisor: Prof. Marko Popovic

- Analyzed range of motion and dynamic requirements for a 2 DOF hydro-muscle actuated leg
- Designed a coupling mechanism that locks the leg while maintaining pose in case of serious failure
- Implemented closed-loop control system for leg actuation using four pairs of hydro-muscles
- Developed controllers for hydraulics and coupling mechanism using Arduino microcontrollers
- Implemented Communication protocols between on-board controllers and PC using MATLAB

Work Experience

Graduate Teaching Assistant

Virginia Tech

Aug 2020 – Dec 2020

- Taught fundamentals of PID controller design to undergraduates
- Helped undergraduate students derive the transfer function for a padlock attached to a DC motor
- Conducted experiments related to unlocking a padlock using a connected electric motor
- Clarified questions related to the experiments in the padlock lab

Robotics/Vision Engineer

Parker Hannifin Corp.

Jun 2017 – May 2020

- Developed an automated cell for palletizing over 100 different SKUs reducing labor costs
- Developed an automated laser marker that doubled throughput in multiple manufacturing cells
- Conducted Kaizen events for process efficiency improvements
- Developed an automated cell using UR5 robot and cameras for part recognition and end capped filter
- Developed a urethane end capping cell using FANUC robots

Engineering Intern

Parker Hannifin Corp.

Jan 2017 – May 2017

- Conducted feasibility analysis on automated end capping using collaborative robots
- Programmed controllers for automated part feeding using vibratory feeders
- Implemented image recognition using Keyence CV-X series to detect orientation of parts

Publications

- Way-Vil: Waypoint based Visual Imitation Learning** **2023**
In submission
Ananth Jonnavittula, Sagar Parekh, and Dylan P. Losey
- SARI: Shared Autonomy across Repeated Interaction** **2023**
Under Review
Ananth Jonnavittula, Shaunak A. Mehta, and Dylan P. Losey
- Communicating Robot Conventions through Shared Autonomy** **2022**
International Conference on Robotics and Automation (ICRA)
Ananth Jonnavittula and Dylan P. Losey
- Here's What I've Learned: Asking Questions that Reveal Reward Learning** **2022**
ACM Transactions on Human-Robot Interaction
Soheil Habibian, Ananth Jonnavittula, and Dylan P. Losey
- Learning to Share Autonomy Across Repeated Interaction** **2021**
IEEE International Conference on Intelligent Robots and Systems (IROS) *Best Student Paper Finalist*
Ananth Jonnavittula and Dylan P. Losey
- I know what you meant: Learning human objectives by (under)estimating their choice set** **2021**
IEEE International Conference on Robotics and Automation (ICRA)
Ananth Jonnavittula and Dylan P. Losey

Patents

- Biologically inspired joints and systems and methods of use thereof** **2020**
US010632626B2

Projects

- Path planning and Semantic segmentation for Self-Driving Cars** **Udacity**
- Developed traffic light detection, control and waypoint following for a self-driving car
 - Designed Fully Convolutional Networks using a GPU to identify pixels of a road in an image
 - Implemented behavior planning for a self-driving car utilizing sensor fusion to localize other moving cars on a highway
 - Generated collision free smooth trajectories with lane changing and speed/jerk considerations
- Sensor Fusion and Control for Self-Driving Cars** **Udacity**
- Implemented controllers using model predictive control to drive a self-driving car around a simulated racetrack using cross track error and 100ms latency
 - Developed a 2D particle filter to localize a self-driving car using noisy sensor and control data
 - Utilized an Unscented Kalman Filter to estimate the state of a moving object with noisy lidar and radar measurements
- Computer Vision and Deep Learning for Self-Driving Cars** **Udacity**
- Developed a software pipeline to detect vehicles in a video using Support Vector Machines
 - Identified lane boundaries using color, perspective transforms and polynomial curve fitting
 - Implemented a Convolutional Neural Network to classify traffic signs from the German Traffic Sign Dataset

Technical Skills

Languages: Python, URScript, KUKA KRL
Developer Tools: VS Code, MATLAB, Arduino, Rockwell Studio 5000, FANUC TPP, KUKA WorkVisual
Technologies/Frameworks: Linux, GitHub, ROS, Pytorch, OpenCV, Blender
Robots: Fetch, FrankaEmika Panda, Universal Robots, FANUC, ABB, KUKA, Rethink Robotics
Interests: Imitation Learning, Reinforcement Learning, Computer Vision, Learning from Demonstrations, Deep Learning, Robot Learning, Human-Robot Interaction, Visual Imitation Learning