Ananth Jonnavittula

Blacksburg, VA
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ananth.fyi Google Scholar

Education

Virginia Tech **Aug 2020 – Present**
PhD in Mechanical Engineering *Blacksburg, VA*

Worcester Polytechnic Institute **Aug 2015 – May 2017**
MS in Robotics Engineering *Worcester, MA*

SASTRA University **Jun 2011 – May 2015**
B.Tech in Electronics and Instrumentation Engineering *Tanjore, India*

Research Experience

Graduate Research Assistant **Aug 2020 – Present**
Institute: Virginia Tech *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 **Jun 2022 – Aug 2022**
Company: ABB Inc *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 **Jan 2016 – May 2016**
Institute: Worcester Polytechnic Institute *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 **Aug 2020 – Dec 2020**
Virginia Tech

- 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 **Jun 2017 – May 2020**
Parker Hannifin Corp.

- 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 **Jan 2017 – May 2017**
Parker Hannifin Corp.

- 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 **2024**
In submission
Ananth Jonnavittula, *Sagar Parekh, and Dylan P. Losey*

SARI: Shared Autonomy across Repeated Interaction **2024**
ACM Transactions on Human-Robot Interaction
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 signsfrom 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