Venkat Varun Velpula

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SKILLS

Programming Languages:

Python**,** C, C++ (11-17)

Libraries / Tools:

Pytorch, Numpy, SciKit-learn, ONNX, TensorFlow, TensorRT, MLFlow, CVAT, LabelStudio, Robot Operating System (ROS), Docker, Git, Linux, DVC, Eigen, OpenCV, PCL, Unreal Engine, Airsim

EMPLOYMENT HISTORY

Third Insight – Austin, TX   July 2021 – Present

Machine Learning Engineer

- ○ Created a lightweight detection and tracking algorithm in C++ to identify and track objects with robust state tracking in real time on embedded devices (NVIDIA Xavier/NX) with keypoint based optical flow tracker and deep learning tracker using OSNet and YOLO, which were built with ONNX/TensorRT
- ○ Created efficient image processing pipelines for generating synthetic datasets with photorealistic 3D models using Blender and OpenCV. Allowed us to create millions of synthetic images with segmentation and ground-truth bounding box label data to feed into our training pipelines for our vision networks to pre-label vision datasets for data engineers to modify
- ○ Built company's machine learning training pipeline and storage / deployment solution utilizing MLOps software frameworks such as MLFlow and DVC. This allowed for an effective evaluation of multiple training experiments and deployment of models into our autonomy stack
- ○ Collaborated with Data Engineers and setup out the company's annotation pipeline, integrating Auto ML solutions for automatic labeling of various internal datasets
- ○ Created photorealistic simulation environments with Unreal Engine and utilized Airsim to test developed machine learning algorithms on drones

University of Pennsylvania, Department of CS – Philadelphia, PA   January 2021 – May 2021

Deep Learning and Data Science Teaching Assistant

- ○ Formulated course material and assignments for Computer Vision and Reinforcement Learning sections of the course
- ○ Taught and guided undergrad and grad students through their classes and course capstone project

University of Pennsylvania, Modular Robotics Laboratory (modLab) – Philadelphia, PA   May 2020 – Sept 2020

Summer Research Intern

- ○ Developed a reinforcement learning algorithm for a quadcopter with a gripper to learn optimal trajectory waypoints and yaw angles to grasp an object while optimizing over total distance-to-object and gripping angle constraints
- ○ Designed a four-bar gripper for the quadcopter on Coppelia Robotics simulator for simulating the gripping action

EDUCATION

University of Pennsylvania – Philadelphia, PA   May 2019 – May 2021

Master of Science in Robotics

National Institute of Technology Karnataka – Mangalore, India   May 2015 – May 2019

Bachelors of Technology in Mechanical Engineering

PROJECTS

RRT* path planning for robot in dynamic environments

- ● Implemented an augmented vanilla RRT* path planning algorithm for dynamic environments with a path re-planning concept which is implemented through regrowth of nodes for my "Learning for Robotics class" final group project

Learning Interactions and Dynamics of Swarms

- ● Explored machine learning methods like SINDy, CNNs, RNNs, and NeuralODE to predict future trajectories of swarms with nonlinear dynamics. We concluded that the best approach to predict future trajectories in the transient was only possible with NeuralODE

Instance segmentation using Segmenting by Location (SOLO) Algorithm

- ● Implemented a single-shot instance segmentation algorithm from this research paper by assigning instance categories to each pixel based on location and size of instance. Achieved a mean average precision of 66.3% with a dataset consisting of vehicles, humans and animals