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EDUCATION

M.S. Robotics and Autonomous Systems

Arizona State University, Tempe, AZ

Aug 22 – May 24

4.0 GPA

Coursework: *Robotics Systems, Perception, Optimal Control, Deep Neural Nets, Embedded ML*

PROFESSIONAL EXPERIENCE

Arizona State University, Tempe, AZ: Graduate Services Assistant

Course Grader for *CSE574: Planning and Learning Methods in AI* under Dr. Ransalu Senanayake.

Aug 23 – Dec 23

Eternal Robotics, Hyderabad, India: Robotics Engineer

Dec 21 – July 22

- Platformed a Heavy duty AGV Robot project. Lead System and Software design efforts and built working prototype in a 4-month period.
- Programmed STM32 embedded devices as control units for the features required on the AGV robot. Wrote OS firmware for task scheduling using the FreeRTOS Kernel. Transformed tasks into Priority based.
- Integrated Visual Odometry and wire guided capabilities using Python into the AGV robot. Made use of Jira, Git and Miro software for Team programming efforts.
- Designed efficient PCB layouts on KiCAD and Altium minimizing space without sacrificing performance or safety.
- Coded C++ driver programs for Ethernet, Wi-Fi and BLE capabilities on a Texas Instruments System-on-Module (SoM) Linux board. Crafted the Communication System to run coherently with Android and iOS apps for Operator usage.
- Built a robot driver testing and maintenance toolkits that enables robot unit and full testing during manufacturing. It helped bring down robot testing phase from 3 weeks to 1 week before deploying.

PROJECTS

Human Pose Estimate using IMU devices, Arizona State University

Fall 23

- Developed a Deep Learning model for human body posture estimation using IMU data from multiple devices.
- Used LSTM architecture to auto-regressively generate 144 body pose estimates, which were then processed to SMPL poses for enhanced visualization.
- Successfully optimized the model to a compact 2MB size for efficient deployment on an Arduino Nano board.

Monocular Camera Depth Estimation, Arizona State University

Spring 23

- Turned a Smartphone camera into a Camera – IMU system to estimate distance, utilizing Affine Homography and a Kalman Filter observer. Enabled to accurately measure object distances with a tolerance of $\pm 5\text{cm}$.
- Compared against other VIO frameworks, such as VINS-Mono and ROVIO, and optimized for better performance. Our Stack ran 20% faster than either VIO framework while maintaining object detection to 95% of the tests.

Propaganda Detection Machine, Arizona State University

Spring 23

- Conducted a detailed literature review focusing on fine-grained propaganda analysis, experimenting with NLP techniques like Word2Vec and tiktoken.
- Employed a pre-trained BERT model, augmented with a transformer architecture, to enhance the accuracy and efficiency in propaganda detection.

Inverse Optimal Control using PDP, Arizona State University

Spring 23

- Developed a Pontryagin Differentiable Programming (PDP) based imitation learning methodology to decipher model dynamics and deduce optimal control policy.
- Implemented a Python-based simulation for a cart-pole system to demonstrate Imitation Learning.

Gough Stewart Platform, Mahindra Ecole Centrale

Summer 19

- Developed a 6-axis Parallel Gough-Stewart Platform robot that can self-orient itself to counter gravity.
- Implemented Quaternion based controllers for platform maneuvering.

TECHNICAL SKILLS

Programming Languages: C, C++, Python, C#, R, MATLAB, JS, Julia, Rust, Bash, SQL.

ML Frameworks: Pytorch, Tensorflow-Keras, Scikit-Learn, Pytorch Lightning, OpenVINO.

Robotics Frameworks: ROS2, Gazebo, MoveIt, Mujoco, Stable baselines, CoppeliaSim.

Tools, Databases, and OS: Node.JS, Express.JS, PostgreSQL, AWS, Heroku, Git, Windows, Linux.

Robotics: Kalman Filters, Planning, Localization, Computer Vision, Reinforcement Learning, SLAM.