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Shivayogi Akki

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Houghton, MI

Graduate Mechatronics Engineering student specializing in Robotics, Controls, Model-Based Control, PLC, and HMI. Actively seeking full time opportunities starting Jan 2024.

EDUCATION

Michigan Technological University | Houghton, MI
MS. Mechatronics **|** GPA: 3.44/4.0 Expected Dec 2023
Relevant Coursework: Robot Operating System | Real-Time Robotics | Dynamics and Kinematics of Robotic Platforms | Distributed Embedded Control System | Advanced PLC

Visveswaraya Technological University | India
BE. Mechanical Engineering **|** GPA: 3.0/4.0 Aug 2021

PROFESSIONAL EXPERIENCE

Michigan Technological University | Graduate Research Assistant | Houghton, MI Jan'23 - Present
- Developed a Unitree Go1 robot **xml** file from stl files and integrated it with MuJoCo MPC package by Google DeepMind.
- Analyzed simulation data to establish a baseline for a reinforcement-based controller. Implementing **reinforcement learning** techniques using Stable Baselines3 on Unitree Go1 robot to develop adaptable robot movement controllers for various terrains.

Michigan Technological University | Graduate Research Assistant | Houghton, MI Aug'22 - Present
- Successfully managed and demonstrated Physics lab experiments to 252 students across 9 batches, while also analyzing and grading Applied Statics coursework for a class of 58 students.

Indian Institute of Information Technology | Robotics Intern **|** Dharwad, India Oct'21 - Dec'21
- Led development efforts for the autonomous navigation system of MITRA, a humanoid robot worth $88k, to assist people at retirement homes. Utilized **2D LIDAR mapping and ROS** remote communication to optimize robot functionality.
- Collaborated with teams to ensure future integration of systems like object identification, voice, and walking assistance.

SKILLS AND CERTIFICATIONS

- **ROS** | Gazebo | SLAM | **MuJoco** | **Matlab & Simulink** | Linux | RoboGuide | **Solidworks |** LabVIEW | C++ | C | **Python** | **RSLogixMicro** | GitHub | FactoryTalk View (Rockwell Automation) | Word | PowerPoint | Excel | MotoTune
- ROS for Beginners 2: Localization, Navigation, and SLAM | Fundamentals of PLC | Fanuc Handling Tool Operation and Programming | MathWorks Reinforcement Learning Onramp

PROJECTS

Simulation based analysis of Industrial Assembly line using HIL with PLC module Mar'23-Apr'23
- Successfully integrated the **RoboGuide** robot assembly simulation and PLC using Ethernet connection and TCP/IP protocols. Established communication and I/O mapping between both systems to assign inputs and outputs, enabling the use of PLC to send input signals to operate the assembly simulation and retrieve output signals from the simulation.

Development of Hybrid Electric Vehicle Powertrain Controller using Stateflow Nov'22-Dec'22
- Developed a model-based high-level controller for hybrid electric learning modules using **Simulink and state flow logic**.
- Utilized the MotoHawk code builder plug-in in **MATLAB** to convert the controller model into C++ code, resulting in a 15% reduction in code complexity and a 25% increase in code execution speed.
- Flashed the C++ code to the desktop simulator to run simulations and observe the functioning of the hybrid car model with different conditions using the MotoTune software. Verified the functioning of the hybrid electric vehicle by connecting the model to the hardware and conducting continuous loop simulations, resulting in a 95% achievement of project objectives.

Development of model based electronic throttle valve remotely controlled via CAN Nov'22
- Designed and implemented a Simulink model for a discrete **PID controller** to regulate the operation of a throttle valve with a DC motor, utilizing CAN communication protocols for remote control.

Parallel Operations with Multiple Robotic Arms Apr'22
- Demonstrated expertise in utilizing **inverse kinematics** and Matlab/Simulink Simscape to design and operate dual-armed YuMi ABB robots for parallel operations, resulting in a 30% increase in production efficiency.

Design of an end effector to automate the process of plucking fruits Dec'22
- Designed and **3D printed** a successful end effector to automate the process of fruit harvesting. Conducted lab testing with a Fanuc robot, achieving a 90% success rate in effectively plucking fruits from trees.

Face Detection and Tracking Apr'22
- Developed and implemented a Python-based face detection and tracking system in **ROS** (Robot Operating System) for a robot.