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Shivayogi Akki

akkisc99@gmail.com
Houghton, MI

Graduate student in Mechatronics, Robotics, and Automation Engineering, with a focus on Robotics, Controls, Model-Based Control, PLC, and HMI. Eagerly pursuing full-time opportunities beginning January 2024.

EDUCATION

Michigan Technological University - Houghton, MI
- **MS. Mechatronics**   GPA: 3.39/4.0   **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**

SKILLS

Softwares: RSLogix 5000, FactoryTalk View, RoboGuide, MATLAB & Simulink, Robot Operating System, MuJoco, SolidWorks, LabVIEW, Python, C++, C, GitHub, Linux, VS Code,

Certifications: ROS for Beginners 2: Localization, Navigation, and SLAM, Fundamentals of PLC, Fanuc Handling Tool Operation and Programming, MathWorks Reinforcement Learning Onramp

PROFESSIONAL EXPERIENCE

Michigan Technological University - Graduate Research Assistant, Houghton, MI   **Jan'23 - Present**
- Conducted a comparative study of MPC and RL controllers on the Unitree Go1 quadrupedal robot defined in XML format, addressing controller selection challenges, and aiding new researchers in decision-making, while co-authoring an IROS research poster presentation.
- Implemented predictive sampling algorithm using VS Code for MPC, refining actions for precise locomotion, and employed PPO algorithm in PyCharm IDE for RL, enhancing adaptability through interactive learning.
- Validated controller performance with standardized tasks, trajectory analysis (using Python and MATLAB), and experiments under perturbation and uncertainty, contributing insights for quadrupedal locomotion in various applications.

Michigan Technological University - Graduate Teaching Assistant, Houghton, MI   **Aug'22 - Present**
- Teaching real-time robotics applications with Fanuc robot, including calibration, painting, welding operations, and PLC integration. Involved in hands-on training and practical demonstration of robot operations and PLC connections.
- Led and executed Physics lab demonstrations for 360 students across 14 batches, ensuring comprehensive understanding and engagement. Graded Applied Statics coursework for a cohort of 58 students, maintaining evaluation standards.

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 integration of systems: object identification, voice recognition, and walking assistance.

PROJECTS

Simulation based analysis of Industrial Assembly line using HIL with PLC module   **Mar'23 - Apr'23**
- Executed simulation-based analysis of an industrial assembly line using Hardware-in-the-Loop (HIL) and PLC integration. Connected RoboGuide assembly-line simulation and PLC via Ethernet and TCP/IP protocols, for synchronized operation.
- Implemented communication protocols and I/O mapping between simulation and PLC, enabling dynamic control of the assembly process. This project showcased expertise in integrating diverse systems for improved industrial automation.
- Addressed the demand for efficient assembly line optimization by leveraging simulation and PLC technology. The project aimed to enhance understanding of real-time assembly processes and refine operational strategies.

Development of Hybrid Electric Vehicle Powertrain Controller using Stateflow   **Nov'22 - Dec'22**
- Developed a high-level MotoTron Control System for Configurable Hybrid Electric Learning Modules (CHELM) using a model-based embedded control system design approach (with Simulink, Stateflow logic and MotoHawk code builder in MATLAB), enhancing the efficiency and effectiveness of the engine and motor controllers.
- Designed and validated six sub-models within the control module and a stepper motor driving model, contributing to the comprehensive development of the MotoTron control system.
- Generated control signals for engine and motor on/off, engine state control, and torque provision, as well as driving signals for the coils of a step motor, optimizing the control of the engine throttle and overall system performance.

Design of an end effector to automate the process of plucking fruits   **Dec'22**
- Engineered and 3D-printed an effective end effector for automating fruit harvesting using SolidWorks and RoboGuide for robot simulation. Programmed the robot teach pendant for apple plucking, showcasing hands-on automation skills.
- Achieved 90% success rate with a Fanuc robot, addressing the need for automation solutions in agricultural processes.

Face Detection and Tracking   **Apr'22**
- Integrated a two-wheeled robot to identify and follow human faces in real-time. This involved utilizing computer vision libraries and developing Python script to manage robot's movements and camera feed processing in the ROS framework.