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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 to address controller selection challenges, while co-authoring an IROS research poster presentation
- Implemented predictive sampling algorithm for MPC, refining actions for precise locomotion, and employed PPO algorithm 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**

- Integrated **RoboGuide** robot assembly simulation and **PLC** via Ethernet and TCP/IP protocols, establishing communication and **I/O mapping** between both systems for input-output assignment via **HMI**
- Employing the PLC to transmit input signals for operating the assembly-line simulation and receiving output signals from the simulation to the PLC

Development of Hybrid Electric Vehicle Powertrain Controller using Stateflow **Aug'22 - Dec'22**

- Created **Simulink** model for a hybrid electric vehicle (CHELM) and implemented it in Woodward ECM-0565-128-0701-C
- Utilized **HIL** testing to generate test signals and assess the blending strategy of the hybrid electric vehicle through Mototune

Development of model-based electronic throttle valve remotely controlled via CAN **Aug'22 - Dec'22**

- Developed a Discrete **PID Controller** and calibrated gains for precise control of an electronic throttle system's operations using a DC motor in accordance with the acceleration value
- Established **CAN** communication between two ECUs, utilizing MBD approach to achieve remote control of the throttle body
- Achieved approximately 95% accuracy in the measurement and calibration of TPS and PPS values, ensuring precise monitoring and control of throttle and pedal positions for optimal engine 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 ~85% 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 a human faces utilizing computer vision libraries and developing Python script to manage robot's movements and camera feed processing in the ROS framework