ATHARV SATHE

assathe@andrew.cmu.edu. (412) 626—2921 www.linkedin.com/in/atharvsathe https://github.com/atharvsathe

EDUCATION

Carnegie Mellon University Pittsburg, USA
Master of Electrical and Computer Engineering. GPA: 3.89/4 May, 2021

Vishwakarma Institute of Technology Pune, India
Bachelor of Instrumentation and Control Engineering May, 2018
Honors in Reliability and Testing. GPA: 9.38/10

SKILLS

Programming languages: Python, C, C++, Swift
Softwares and Frameworks: Linux**,** MATLAB, ROS, FreeRTOS, AWS EC2/ S3/ IoT Core, Eagle, CUDA, OpenMP, gem5, jMavSim
Certificate courses: Aerial Robotics (UPenn), Control of Mobile Robots (GaTech) at Coursera

PROFESSIONAL EXPERIENCE

Emerson Exports Engineering Centre, India - Systems Engineer Jun 2018 - Jun 2019
- Implemented multi-loop control algorithms on DELTA V distributed control system for automation of pharmaceutical industry
- Performed on-site testing against IEC 61131standard with a team of 9 for successful Factory Acceptance Test in South Korea

Tech Mahindra, Maker's Lab, India - Technical Intern Jun 2016 - Aug 2016
- Devised trilateration algorithm with ± 3cm accuracy on ARM microprocessor for indoor localisation based on Wi-Fi beacons
- Refactored encoders and sonar sensor fusion subroutines with the use of software interrupts to reduce execution time by 12.5%

RESEARCH EXPERIENCE

Carnegie Mellon University(SEI) - Sensor Security and Control - Graduate Researcher Jan 2021 - Present
- Contributing to UberSpark, a compositional verification of security framework for extensible hypervisors with 10% overheads
- Developing line follower robot environment for OpenAI Gym to evaluate Root of Trust implementation for control applications

Vishwakarma Institute of Technology, Robotics Lab Aug 2017 - Dec 2017
- Designed and manufactured PCB for BLDC motor driver with 20% smaller area with better heat dissipation
- Controlled speed of BLDC motor by PD algorithm reaching a settling time of 0.6 secs with feedback from Hall sensors

ACADEMIC PROJECTS

Hardware Implementation for Weak Deterministic Multithreading System Jan 2021 - Present
- Aiming to implement weak DMP for cortex M3 by use of instruction counting in hardware with negligible overheads
- Comparing hardware implementation with current software solutions on PARSEC, Splash-2, and synchrobench benchmarks

Designing an Observer for Nonlinear Quad-rotor System Aug 2020 - Dec 2020
- Demonstrated 3x improvement in position tracking error with a Luenberger observer over observer less system
- Compared performance of LQR controller with EKF for a linearised and non-linear model with multiple noise injection levels

Multicore Energy Efficient RTOS Schedular Aug 2020 - Dec 2020
- Modified EDF scheduler in Linux kernel by adding core affinity support while maintaining schedulability across all cores
- Implemented dynamic frequency scaling on ARM microprocessor to reduce power consumption by up to 25mW
- Demonstrated bin packing heuristics for periodic tasks to improve utilisation by upto 2% over default GRUB-PA algorithm

Robot Grasping - Setting and Resetting Environment Jan 2020 - May 2020
- Formulated inverse kinematics for trajectory planning and implemented grasping on 7 DoF Franka Panda robotic arm
- Developed vision-based grasping in CoppeliaSim with over 90% repeatability and experimented with RL agent using RLbench
- Demonstrated novel approach of a pre-grasp push for the objects near obstacles moving them to a favorable position for a grasp

Coordinated Robot Network for Warehouse Management Jan 2020 - May 2020
- Built palm-sized robots with IMU sensor fusion for locomotion and RFID tags for position with a precision of 8° up to 18 cm
- Deployed Carrier Sense Multiple Access (CSMA) communication protocol with a central RPi server over star topology
- Maintained a UI accessible by local network devices with real-time location and status of all 4 robots

Industrial IoT Framework for Portable Tools Jan 2018 - May 2018
- Designed minimalistic firmware for AVR controllers with a dynamic sampling rate to reduce power consumption by 66%
- Maintained a web dashboard on AWS for data visualisation and forecasting while generating SMS alerts for discrepancies
- Ranked in the top 10 in Techgium 2018, a national level innovation competition in India organised by Larsen and Toubro (L&T)

PUBLICATION

- **'AUTOBOT-X: A Low-cost Extensible Security Platform for Robotics'** at IROS 2021 IEEE/RSJ (Under Review)

LEADERSHIP

Project Mentor at CRDF, Collaborative Research & Development Forum. Jan 2020 - Present
- Work as a mentor and liaison between industry and undergraduate students encouraging them to pursue research projects

Core member, Robotics Lab, Vishwakarma Institute of Technology. Sep 2016 - May 2017
- Developed lecture series on embedded systems and conducted hands-on workshops for undergraduates with a team of 15 students