Aditya Gawali

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EDUCATION

Virginia Polytechnic Institute and State University, Blacksburg **Exp: May 2024**
Master of Science in Computer Engineering
Relevant Courses - Advanced Linux Kernel Programming, Multiprocessor Programming, Network Security

EXPERIENCE

Graduate Engineer Trainee - Larsen and Toubro Limited **Nov 2020- Aug 2021**

- Conducted various testing operations of individual electronic and controller units
- Integrated sub-modules and units into the complete system for trials and operations.
- Designed and deployed highly reliable and robust electronics systems and units for heavy-engineered products.

Embedded Software Intern - Magnes Motors Pvt. Ltd **May 2019 - Jul 2019**

- Implemented data logging automated solutions using a wifi-equipped ESP32 and transmitting data to a centralized unit for future data analysis and testing
- Launched an Android GUI app using Android Studio for the user to visualize the health and essential data of the vehicle.
- Developed intelligent modules using microcontroller for Battery Management System (BMS) increasing operational efficiency by ~20%
- Refactored legacy round-robin architecture to real-time architecture using FreeRTOS resulting in decreasing latency by ~15%

SKILLS

- **Programming Languages:** C, C++, Python, Java, JavaScript, HTML
- **Software:** Linux Kernel, FreeRTOS, Robot Operating System, Git, ESP-IDF, Android Studio
- **Hardware:** x86, ESP-32, STM-32, Raspberry-PI, Kintex-7, Lidar, ATMega-128

PROJECTS

Linux Kernel: CPU Profiler Tool **[Linux Kernel, KProbes, CF-Scheduler]**
Advanced Linux Kernel Programming, Virginia Tech

- Developed a Linux kernel module that probes the scheduler using the Kprobes API of Linux kernel to retrieve the currently scheduled user and kernel space tasks.
- Implemented a Hash map data structure in kernel space to store the stack trace of the tasks and RB-tree data structure to keep a track of the total time a task is scheduled on the CPU.
- Designed the program so as to dump the stack trace of the user and kernel tasks making it easier for the user to backtrace and debug the kernel.

AVITRA: Surveillance and Disaster Mitigation Robot **[ROS, Kinematics, SLAM, ESP-32, PCL]**
Centre of Excellence in Complex and Nonlinear Dynamical Systems, VJTI

- Developed an autonomously navigating Omnidirectional robot capable of performing mobile manipulation for disaster mitigation operations.
- Designed velocity controller using optical encoders, thus optimizing the base locomotion of the bot and improving the overall efficiency of the locomotion,
- Upgraded manipulator to 6-Degrees of Freedom from 5-Degrees of Freedom by designing a manipulator model along with its necessary software to control and execute the operation.
- Implemented Publisher and Subscriber ROS nodes in Python for the robot to detect and reach the target destination.

Self-Balancing and Line Following Robot **[ESP32, HTTP WebServer, FreeRTOS, MPU, Filters]**
Society of Robotics and Automation, VJTI

- Designed a Line-Following and Self-Balancing robot using an ESP32 microcontroller and developed the code base in C using FreeRTOS.
- Launched an HTTP WebServer on the ESP32 to tune and change the control parameters dynamically.
- Interfaced MPU6050, an Inertial Measurement Unit along with a Complementary filter to get a stable pose for self-balancing.
- Integrated Complementary filter with the readings to get the stable pose of the robot
- Designed and Implemented PD controller(Proportional and Derivative controller) to achieve stable results with minimal errors.