GAUTHAM MANOHARAN

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SUMMARY

Robotics and Autonomous Systems graduate with 3.5 years of work experience. Expertise in Controls, Machine Learning, Automation, Embedded Systems, and Software Development. Seeking opportunities starting June 2023.

TECHNICAL SKILLS

Programming: Python, C/C++, Tcl/Tk, ARM Assembly, PLC Programming
Modeling Tools: MATLAB, Simulink, EAGLE, Proteus, SOLIDWORKS
Relevant Skills: ROS, OpenCV, Machine Learning, Deep Learning, AI, Statistical Analysis, PyTorch, Tensorflow, Git

PROFESSIONAL EXPERIENCE

Arizona State University, Tempe, AZ: **Robotics Researcher and Teaching Assistant** Nov 2021 - Current

- Engaged in R&D at ASU Neuromuscular Control and Human Robotics Laboratory in Adaptive Control and Optimal Control applications in Physical Human-Robot Interaction and Rehabilitation Robots.
- Spearheaded construction of novel Ankle Rehabilitation Robot Controller that enhanced performance by 9.85%.
- Instructed students in Circuit Design, Communication Protocols, Programming, and Debugging in Embedded C, ARM Assembly, and MATLAB as lab TA for Real-time Image and Speech Processing on STM32F407G.

Indian Institute of Science, Bengaluru, India: **Data Scientist** Oct 2018 - Dec 2020

- Communicated with clients in transportation industry and aided team in product development to specification.
- Collaborated with cross-functional team from BOSCH to create a traffic modeling framework for Bengaluru and invented solutions by building Predictive Models which minimized vehicle delay in network by 29.6%.
- Programmed Machine Learning Algorithms for travel time prediction from Real-Time GPS data using Tensorflow.
- Optimized PTV VISSIM microscopic traffic flow model with Genetic Algorithm in Python and MATLAB.
- Partnered with Bengaluru Transport Corporation in production of Transit Ridership Prediction Algorithms as part of Software Engineering to improve public bus system, employing ML, Google API, and QGIS.
- **Publication:** Ranju Mohan, Susan Eldhose, Gautham Manoharan, "Network-Level Heterogeneous Traffic Flow Modelling in VISSIM", *Transportation in Developing Economies* (2021).

EDUCATION

Master of Science in Robotics and Autonomous Systems - Electrical Engineering Graduated May 2023
Arizona State University, Tempe, AZ 4.00/4.00
Bachelor of Technology in Electronics and Communication Engineering Graduated June 2018
National Institute of Technology, Calicut 8.37/10.0

ACADEMIC PROJECTS

Bayesian Optimization for Robot-Aided Rehabilitation: Adaptive VIC of Ankle Robot Nov 2021 - April 2023

- Engineered an Adaptive 2D Variable Impedance Control algorithm for the ankle joint of a wearable robot.
- Employed machine learning techniques (Bayesian Optimization and Student-t process regression) to robustly solve controller parameter optimization problems for per subject adaptation.
- Deployed control software in Linux with front-end programming in Tcl/Tk, Python, and back-end coding in C++.
- Validated user speed increase of 9.85% and accuracy improvement of 7.57% through human experiments.

System Integration: Manipulation and Autonomous Local Distribution for Industrial Automation April 2022

- Simulated control architecture for Motion Planning of UR5 6DOF Manipulator in ROS Gazebo for vision based smart part picking on a conveyor belt and SLAM of TurtleBot on factory floor with LiDAR point cloud maps.

Real-Time Object Detection for Autonomous Drone Navigation and Obstacle Avoidance March 2022

- Leveraged OpenCV, Mediapipe, Tensorflow, and YOLO for deep learning convolutional neural network based computer vision for object detection, classification, and human body pose estimation.
- Established obstacle avoidance, body and hand pose based navigation of DJI Tello drone.

Multi-Robot Object Transport Using Potential Field and Symmetric Formation Control Oct 2021 - Dec 2021

- Managed team to produce a multi-robot grasping and transportation strategy in the Robotarium simulator for MATLAB using potential field-based obstacle avoidance, navigation, and graph-based formation control.

Publication: Gautham Manoharan et al., **"Design and Implementation of Micro-Controller Training Kit with GUI Support"**, *Proceedings of 2018 15th IEEE India Council International Conference* (2018).

- Led team to effectuate hardware design, fabrication, and testing of a multi-microcontroller training kit employing Autodesk EAGLE, as innovative approach to embedded systems programming training.
- Coordinated product compatibility validation, testing, JTAG debugging on NXP LPC2148, Microchip PIC18F4550.

AWARDS

Engineering Graduate Fellowship for Academic Excellence, Ira A. Fulton Schools of Engineering, ASU **-** Fall 2022