GAUTHAM MANOHARAN

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SUMMARY

Robotics and Autonomous Systems graduate with expertise in Controls, Machine Learning, and Optimization. Seeking opportunities in Controls and Robotics starting June 2023.

TECHNICAL SKILLS

Programming: Python, C, C++, Tcl/Tk, ARM Assembly, PLC Programming
Modeling Tools: MATLAB, Simulink, EAGLE, Proteus, SOLIDWORKS
Relevant Knowledge: ROS, OpenCV, Machine Learning, TensorFlow, PyTorch, Keras, Embedded Systems

PROFESSIONAL EXPERIENCE

Arizona State University, Tempe, AZ: **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 Robotics.
- Spearheaded construction of novel Ankle Rehabilitation Robot Controller and enhanced performance by 9.85%.
- Instructed students in Circuit Design, Programming, and Debugging in Embedded C, ARM Assembly, and MATLAB as lab TA for Real-time Digital Signal Processing and Analog and Digital Circuit Design courses.

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 Supervised Machine Learning Algorithms for travel time prediction from Real-Time GPS data.
- Optimized PTV VISSIM microscopic traffic flow model with Genetic Algorithm in Python and MATLAB.
- Partnered with Bengaluru Transport Corporation in database management and production of Transit Ridership Prediction Models to improve public bus system through software development employing 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
Coursework: Design and Control of Robots, Multi-Robot Systems, Adaptive Control

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.
- Deployed control software in a Linux environment utilizing Tcl/Tk, C, Python, and MATLAB.
- 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 Motion Planning of UR5 6DOF Manipulator in ROS Gazebo for smart part picking on a conveyor belt.
- Implemented Vision based Autonomous Navigation of TurtleBot on factory floor with LiDAR based SLAM.

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

- Computer Vision: Leveraged OpenCV, Mediapipe, Tensorflow, and YOLO for object identification and human body pose estimation.

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 programming training.
- Coordinated and conducted product compatibility validation with NXP LPC2148 and Microchip PIC18F4550.

AWARDS

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