Vishal Gattani

4400 Calvert Rd, Apt 280, College Park, MD 20740
Phone: +1(480) 376 3397 | vishalgattani09@gmail.com
https://github.com/vishalgattani | https://www.linkedin.com/in/vishal-gattani-71692611a/

Education

University of Maryland College Park, MD — Aug 2021 - May 2023
Master of Science, Systems Engineering — 3.762/4 CGPA

International Institute of Information Technology, Bangalore (IIIT-B) — Aug 2015 – Sept 2020
Integrated Master of Technology, Electronics and Communication Engineering — 3.54/4 CGPA

Work Experience

Software Engineer — Jul 2023 – Present
Simulation-based System Design Lab (SBSDL), UMD — College Park, MD

- Developed a GUI app for streamlining simulation-based verification of autonomous systems by randomizing navigation missions, generating obstacle scenarios, and supporting multi-robot simulations.
- Implemented time of day feature in Unity to test and evaluate the robot capabilities in high exposure settings.
- Managing a team of 5 developers in creating a cloud simulation infrastructure, enabling cloud-based simulations for efficient testing and validation of autonomous systems.

Graduate Research Assistant — Nov 2021 – May 2023
Simulation-based System Design Lab (SBSDL), UMD — College Park, MD

- Employed scenario descriptive language Scenic for Unity simulator to probabilistically generate scenarios for rapid operational environment development and testing.

Research Associate — Oct 2020 – July 2021
Surgical and Assistive Robotics Lab (SARL), IIIT-B — Bangalore, India

- Analyzed human motion capture with Microsoft Kinect V2 and Azure Kinect to achieve efficient motion capture.
- Managed a team to develop a dual-arm robotic system through depth cameras for biomimetic control.

Publications

V. Gattani and M. Rao, (2021), "An integrated system design interface for operating 8-DoF robotic arm", Published in 2021 ICCAS.

Academic Projects

Robotics

- **Self-Driving Car Sim** - Created a simulator incorporating a **Hybrid A*** path-finding algorithm, combined with a PID controller, using Voronoi Field and Euclidean distance as heuristics for a self-driving car.
- **Humanoid Arm Control** - Created a teleoperation system to visualize, program, and control upper-limb motion in real-time through Motion Capture with a precision of 0.1°using Blender Game Engine.
- Implemented **Dijkstra**, **A***, and **RRT** for holonomic robots.
- **Probabilistic roadmaps (PRMs)**: Generated a 3D trajectory for UAVs using PRMs with **A*** in response to emergencies in urban environments through voxelization of obstacle space using Trimesh library.
- **Sign Language Detection** - Designed a gesture recognition system using **Google's Mediapipe** and **LSTM** networks to detect real-time sign language gestures.
- **Lane Detection** - Detected lanes using a curve fitting approach and estimated road curvature.

Systems Engineering

- **Self-replicating robotic system (SRRS)**: Implemented a simulation system to model, verify, and validate how an SRRS would perform based on its system configuration, attributes, and operating environment.
- Implemented a Bayesian network simulation approach to optimize experimental designs, enhancing belief and assurance in the system's capabilities through the use of Design of Experiments (DoE).

Technical Skills

Languages: Python, C++, C#
Software: Blender, Unity3D, MATLAB, LTSpice, MultiSIM, Arduino, Cameo Systems Modeler
Developer Tools: ROS, Git, VS Code, Processing
Operating Systems: macOS, Windows, Ubuntu