# Vishal Gattani

4254 E Carla Vista Dr, Gilbert, AZ 85295
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 |

## RESEARCH AND INTERNSHIP

**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.
- Implemented dynamic time of day feature to test and evaluate the simulator capabilities in high exposure settings.

**Master's Thesis**                                               Jan 2023 – April 2023

*Experimental Design using Bayesian Network Simulation-based Assurance Cases, UMD*   College Park, MD
- Executed a Bayesian framework to determine experimental designs to support the development of assurance cases.
- Performed Design of Experiments (DoE) to determine parameters that increase belief in a system's capabilities.

**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

**Simulation**
- **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. (Link)

**Motion Planning**
- Implemented **Dijkstra**, $\mathbf{A}^*$, and **RRT** for holonomic robots.
- Generated a 3D trajectory for UAVs using **Probabilistic roadmaps (PRMs)** with $\mathbf{A}^*$ in response to emergencies in urban environments through voxelization of obstacle space using Trimesh library.

**Computer Vision**
- **Sign Language Detection** - Designed a gesture recognition system for ASL using **Google's Mediapipe** and **LSTM** networks to detect real-time sign language gestures.
- **Stereo Disparity** - Estimated pixel-wise depth by computing Disparity Map using sliding-window approach.
- **Lane Detection** - Detected lanes using a curve fitting approach and estimated road curvature.
- **VisualODOM** - Implemented visual odometry to estimate the trajectory of a self-driving car using feature detection and matching, disambiguation of camera pose from Perspective-n-Point solution using the RANSAC.

**Systems Engineering**
- Executed a simulation system to model, verify and validate how a self-replicating robotic system performs based on its system configuration, attributes, and operating environment.

## TECHNICAL SKILLS

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