

# ADHEESH CHATTERJEE

adheeshchat@gmail.com | +1 (240) 784-7779 | Washington DC | [adheeshc.github.io](https://github.com/adheeshc)

## EXPERIENCE

---

- 3D Computer Vision Engineer**, VanGogh Imaging Inc, *Nov 2021 - Present*
- Spearheaded the development of the Unity aspect of products by constantly updating and enhancing existing features.
  - Successfully led the migration of the entire Android codebase to iOS, ensuring seamless integration and functionality.
  - Collaborated with multiple clients to provide innovative computer vision solutions, customizing our SLAM algorithm to meet their unique requirements.
  - Facilitate seamless communication & sensor data exchange between diverse client hardware devices & our proprietary algorithms, resulting in optimal performance and client satisfaction.
  - Proficiently utilized C++, C, C#, Swift, and Python programming languages on a daily basis, as well as version control tools such as JIRA and Git to ensure optimal performance and timely delivery of projects.
- Sr. Computer Vision Engineer**, Vidalign Inc. ([characterfacegen.com](https://characterfacegen.com)) *Aug 2020 - Nov 2021*
- Developed a precise facial landmark detection and tracking module used for real-time 3D mesh generation.
  - Designed a parametric model for facial wrinkles & tension maps to improve the 3D morphable model.
  - Co-Led team of 4 engineers in deploying SLAM & vision pipelines for 3D reconstruction with LiDARs and cameras.
  - Primarily used Docker and Git to set up deployment of prototypes, maintain communication and ensure version control.
- Teaching Assistant**, University of Maryland *Jan 2020 - May 2020*
- Provided course support and assisted in the development of new course material for the Robot Learning course covering topics focused on Reinforcement Learning, Control through Machine Learning, and Evolutionary Robotics.
  - Performed all assistant teaching duties including mentoring, lecturing, researching, and evaluation help.

## PROJECTS

---

### SLAM (Simultaneous Localization and Mapping) Projects

- Developed and implemented the FastSLAM algorithm to accurately track dead reckoning and estimate robot paths based on obstacle detection in dynamic environments.
- Employed advanced probabilistic filtering techniques, including Extended Kalman Filter, Unscented Kalman Filter, and Particle Filter (Monte Carlo), to effectively handle localization errors and improve robot position estimation accuracy.
- Deployed the RTAB-Map ROS package on a mobile robot to generate a high-fidelity 3D map of the surrounding environment, enhancing robot perception and navigation capabilities.

### Computer Vision Projects

- Developed various computer vision techniques, including Visual Odometry, Lane Detection, Traffic Sign Recognition and Classification, Lucas Kanade Object Tracker, Color segmentation using Gaussian Mixture Models
- Leveraged the Structure from Motion (SfM) approach to reconstruct a high-fidelity 3D point cloud, employing advanced techniques such as RANSAC-based outlier rejection, PnP estimation, & Bundle Adjustment for optimal accuracy.

### Deep Learning Projects

- Designed and developed an encoder-decoder CNN architecture for semantic segmentation and depth estimation of RGB-D images, with a focus on Cityscapes and Kitti datasets.
- Created an object detection system using RCNN, implementing selective search & region proposal techniques, & extending it to support multi-class object detection. Demonstrated image classification capability on the ImageNet dataset.
- Designed a Recurrent Neural Network (LSTM) for music generation, training it to identify and learn the patterns in raw sheet music encoded in ABC notation.
- Built a facial detection model (VAE) capable of learning the underlying latent variables in face image datasets, which was leveraged to adaptively re-sample the training data improving overall performance and reducing algorithmic unfairness.

### Sensor Fusion Projects

- Processed Lidar point cloud, Radar, and Camera data to calculate total time to collision from preceding vehicles and 3D object tracking in C++ using Point Cloud Library
- Developed a ROS interface for localization on the motion capture workspace using raw sensor data (IMU, Camera, Magnetic Encoders) for tracking a non-holonomic differential drive robot using a Raspberry Pi and an Arduino Nano.

## EDUCATION

---

- Masters of Engineering**, Robotics *Aug 2018 - May 2020*  
University of Maryland GPA: 3.63
- Bachelor of Technology**, Mechanical Engineering w/ Minors in Computer Science *Aug 2014 - May 2018*  
Vellore Institute of Technology GPA: 3.6

## SKILLS

---

**Interests:** SLAM, Object Detection and Tracking, 3D Reconstruction, 3D Mapping, Sensor Fusion, Optimization  
**Programming:** Python, C, C++, C#, Swift, ROS, Matlab, OpenCV, OpenGL, Pytorch, Tensorflow, Cmake, Unity  
**Engineering:** SolidWorks, Gazebo, VREP, Raspberry Pi, Arduino, ANSYS Workbench, ANSYS Mechanical  
**Certifications:** Udacity Robot Software Engineer, Coursera Deep Learning Specialization