

Abhinav Modi

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EDUCATION

University of Maryland, College Park
Masters of Engineering in Robotics

College Park, MD
Aug. 2018 - May 2020

- **GPA:** 4.0/4.0

Birla Institute of Technology and Science(BITS), Pilani
Bachelors of Engineering(Hons.) in Mechanical Engineering

Rajasthan, India
Aug. 2014 - May 2018

- **GPA:** 7.53/10(3.18/4)

Relevant Coursework: Computer Processing of Pictorial Information, Perception for Autonomous Robots, Control of Robotic Systems, Decision making for Robotics, Software Development for Robotics

TECHNICAL SKILLS

Concepts & Interests
Modeling and Analysis
Software development
Softwares & Tools

Deep Learning, Computer Vision, Data Structures and Algorithms, Image Processing
Solidworks, MSc ADAMS, Simulink, MATLAB
Agile development, Automated/Manual Unit testing, Google Mock/Test framework
C++, ROS, Python, Tensorflow, OpenCV, Git, Numpy, Matplotlib, Linux, LaTeX

RESEARCH EXPERIENCE

Perception and Robotics Group, University of Maryland
Research Assistant under Prof. Yiannis Aloimonos

Aug. 2018 - Present

- Worked on compression of a neural network pipeline which predicts dense depth, optical flow and camera pose. Implemented compression techniques like network distillation and model quantization across different network architectures to compare the results.
- Additionally, implemented Geometric and Model Predictive based controllers for online trajectory tracking on quadrotors.

Autonomous Micro Aerial Vehicle(AMAV) Team
Research Assistant under Prof. Derek Paley

Dec. 2019 - Present

- Worked with a team of 20 students to develop an autonomous micro aerial vehicle to participate in the VFS MAV Student Challenge.
- Working with Intel's depth and stereo modules to perform realtime SLAM on micro UAVs for dynamic obstacle avoidance and navigation.
- Winners of the 7th edition of the competition held at the University of Pennsylvania, PA in May 2019.

PROJECTS

- **GapFlight:** Developed a Gaussian-Mixture-Model(GMM) based vision feedback system to autonomously fly a quadrotor through a window of known dimensions but unknown position and orientation.
- **Attitude Estimation:** Implemented and compared madgwick and unscented kalman filters(UKF) to estimate orientation of a 6-DoF IMU.
- **Advanced Lane Detection:** Developed a pipeline to mimic turn prediction system in self-driving cars, using histogram of lane pixels.
- **Structure from Motion:** Implemented a pipeline to generate 3D map and estimate camera pose using image sequences from a monocular camera.
- **Edge Detection using Pb-Lite:** Edge detection in images with texture reduction using "Probability of Boundary" method by performing k-means clustering on texture, brightness and color gradient maps.
- **Cable Suspended Load from a Quad:** Implemented Geometric Control based on differential flatness to track trajectory of a load suspended from a quadrotor

LEADERSHIP EXPERIENCE

Inspired Karters, Formula Student Team, BITS Pilani
Team Captain

Feb. 2016 - Feb. 2017

- Established a new team structure for a team of 50 students from multiple disciplines to incorporate a KTM 390 engine, smaller wheels (10"), and a full body aero-package, all for the first time in the history of the team.
- Successfully raised INR 150,000 as a team in only one month's time, amounting to INR 7,50,000 during the whole year.