NAGARJUN VINUKONDA
Robotics Engineering Graduate
📍 19 Dover St, Worcester, MA 01609

✉ vinukondanagarjun4@gmail.com   🔗 www.linkedin.com/in/Nagarjun-Vinukonda   ☎ +1 508-374-3112

OBJECTIVE:

Seeking for Spring Internship/Co-op 2021 in Motion Planning and Controls application to Robotics.

EDUCATION:

- **Worcester Polytechnic Institute** (WPI), Worcester, MA: MS in Robotics Engineering   GPA 4.0/4.0   May 2021**(expected)**
- **Vellore Institute of Technology** (VIT), Vellore, India: BS in Mechanical Engineering   CGPA 8.86/10   May 2019

PROJECTS:

Behaviour planning for Autonomous driving   *Aug '20 - present*
Tools: MATLAB, Simulink, C++.
- Implementing behaviour prediction engine with MPC controller for lane changing task in simulation environment with multi agents.
- Determining cost functions to create constraints for Lane changing task in decision making module.

Collision avoidance in dynamic environment using velocity obstacles   *Aug '20 - present*
Tools: ROS, Python, Gazebo, C++
- Implementing state of the art method ORCA for social aware navigation of freight robot in hospital environment.
- Integrating perception and localization modules for detecting dynamic obstacles.
- Modelling and Integrating RVO2 libraries into ROS environment for implementing ORCA in gazebo.

TurtleBot Path Tracking using PID Controller | **Link**   *May'20 – Aug'20*
Tools: ROS, Gazebo, C++
- Hardware and software implementation of Turtlebot path tracking system using PID controller.
- Experimented on single and multi-goal points determining steering control at each instant of time while navigation.

Route Planning on Open Street Map   *May'20-Aug'20*
Tools: python, C++, OSM
- Implementation of BFS, DFS, A Star, Dijkstra and RRT Star planning algorithms.

Indoor 3D mapping using RGBD camera | **Link**   *Jan '20 –May '20*
Tools: ROS, Python, Gazebo
- Generating 2D occupancy grids and 3D point cloud data while navigating mobile robot in gazebo using RTAB mapping.

3D object detection using Modified Frustum PointNets | **Link**
Tools: Python, Tensorflow   *Jan '20 –May '20*
- Performed 3D object detection on the KITTI dataset with the goal of reduced computation time and accuracy.
- Experimented with using SqueezeDet in Frustum PointNet architecture for 2D detection instead of fine-tuned Fast R-CNN.

Traffic Signal Detection System | **Link**
Tools: OpenCV, Python   *Sep '19 – Dec '19*
- Produced an experimental comparative study on a robust system that detects traffic signals accurately.
- Integrated Darknet YOLOv3 Deep Neural Network for robust real time object detection and SVM for status recognition.
- Extracted image features using SIFT & SURF, Hough transforms, Top-hat filter algorithms compared statistically with YOLOv3.

Shared Autonomy in Motion Mapping Teleoperation | **Link**   *Jan '20 –May '20*
Tools: ROS, Python, OpenCV, Gazebo
- Implemented Autonomous, Semi-Autonomous functions for moving 7 DOF Baxter robot arms in ROS.
- Created Meshed, Cone and Take Control Methods for Semi-autonomous function reducing human fatigue while teleoperation.
- Programmed Aruco Marker detector for identifying cups in gazebo environment using OpenCV bridge.

Dynamic Step planning for Exoskeleton Stair Climbing | **Link**   *Sep '19 – Dec '19*
Tools: ROS, PCL, C++, Python, Solid Works
- Implemented simulation environment of Lidar laser scan and published its data in Point cloud using ROS and Gazebo.
- Investigated DMPs and assisted to train the DMPs generating trajectories for determined joint angles.
- Implemented path planning approach algorithm for stair climbing and generating step trajectories.
- Operated Motion capture lab to collect the gait data of 15 subjects using Vicon Nexus for generating joint angles.

SKILLS:

Software: C++, Python, MATLAB, ROS, OpenCV, Gazebo, TensorFlow, Solidworks, Ansys, Linux.

Courses: Motion Planning, Robot Controls, Robot Dynamics, Advanced Robot Navigation, Deep Learning, Computer Vision.

WORK EXPERIENCE:

Research Assistant, University of Plymouth, Plymouth, United Kingdom | **Link**   *Jan '19 – June '19*
Interdisciplinary Centre for Computer Music Research, Dr Eduardo Miranda
Role: To study BCI methods and develop a real-time integrated system that connects brain waves to prosthetic arm enabling severe motor impairment patient to play musical instruments using prosthesis.

PUBLICATION:

- Review on Contemporary Trends in Radiator Design and Testing of Automobile Radiators - International Journal of Mechanical Engineering & Technology, ISSN Online: 0976 – 6359, Vol.9, Issue 12, December 2018.

INDUSTRIAL INTERN:

VEM Technologies Pvt.Ltd., Hyderabad, India   *May '17 – June '17*
- Educated and exposed on the working mechanism of Section 3 of surface-to-air Akash missile and Brahmos missile, Electro-Optical Director, Stabilized Electro-Optical Sight and wash timers.

Astra Microwave Products Ltd., Hyderabad, India   *June '17 – July '17*
- Exposed to work mechanisms of pressure sensors used in power window system along with integrated circuits of radars and industrial electronics.

ACHIEVEMENTS:

SAE Aero-Design International competition, Florida, USA
Lockheed Martin Aeronautics Co. Lakeland, (**Team: Aero-VIT**) -- Regular Class: *Mar 9-11 2018*
- Design of 144 inches wingspan aircraft, 18lbs payload capacity for carrying 24 passengers (Tennis balls).
- Implemented algorithm for prediction of lift and drag using Simulink along with Structural and fluent analysis of aircraft using Ansys.
- Establishing successful test flight along with participation in competition securing second position in Asian-pacific region.

SAE Aero-Design National competition, India
Anna University, (**Team: Flying Inc.**) -- Micro Class: *July 11-13 2018*
- Design and Analysis of 36 inches wingspan radio-controlled aircraft with successful flight test and participation in competition.

Award for Innovation, UK
Project showcase, University of Plymouth   *May 2019*

ACTIVITIES:

Vice-Captain, Team Flying Inc, VIT University   *May '17 – May '19*
Design Head, Society of Manufacturing Engineers, VIT University   *Jan '17 – May '19*
Member, RoboVitics Club, VIT University   *Jan '18 – Jan '19*