VIGNESH SUNDARARAJAN

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Education

Purdue University - School of Aeronautics and Astronautics **West Lafayette, USA**
Master of Science - Aeronautics and Astronautics 2021-Present
Coursework: Artificial Intelligence, Statistical Methods*, Autonomous Systems*, System of Systems Modeling and Analysis*
(* = Ongoing)

SRM University **Chennai, IN**
Bachelor of Technology - Mechanical Engineering 2016-2020

Skills

Programming: C++, Python, MATLAB, R, Bash, HTML, CSS, LaTeX
Frameworks/Libraries: openCV, ROS, numpy, PyTorch, Keras, Tensorflow, scikit-learn, matplotlib, pandas, seaborn
Tools: Git, Linux, CMake, GDB, LLDB, PDB, Jupyter, Gazebo, Confluence, Jira
Ongoing Additional Coursework: Machine Learning, Computer Vision, Deep Learning, Robotics, Model Based Systems Engineering

Projects

Avionics Engineer - Purdue Vertical Flight Systems **West Lafayette, USA**
Purdue University | ***Skills Used: ROS, Python, C++, Gazebo*** Jan 2022 - Present

- Facilitated a transition to a GitHub organization for better code management and collaboration
- Currently working on gaining a thorough understanding of the software stack consisting of the PX4 Pixhawk Autopilot Software, QGroundControl and simulation using ROS & Gazebo

Building an Autonomous Robot to navigate through a model town (Ongoing) **West Lafayette, USA**
Purdue University | ***ROS, Python, CMake, XML, Robot Kinematics, Linux, Computer Vision, SLAM*** Jan 2022 - Present

- Working on an intensive course project involving building an autonomous robot consisting of Ultrasonic sensing, Computer Vision, and Line Tracking capabilities by handling all the sensor data and processing it on a Raspberry Pi using Python and ROS
- Upcoming work involves programming Path Planning, Trajectory Optimization, SLAM and Perception capabilities into the autonomous robot

Aerodynamics Team Member - Purdue Electric Racing **West Lafayette, USA**
Purdue University | ***Skills Used: ANSYS, SolidWorks, Fusion 360, Confluence, Jira*** Aug 2021 - Present

- Designed CFD simulations to correlate Wind Tunnel testing data with simulated data, and achieved ~ 7% margin of error.
- Designed a parametric CFD study for cooling the motor controller of the vehicle with an underbody ducting system, which involved performing geometry cleanup, meshing, and post processing of CFD results to run a half car simulation

Using a GAN with a Perceptual Loss Function for Image Super Resolution **West Lafayette, USA**
Purdue University | ***Skills Used: Python, TensorFlow/Keras, matplotlib, HDF5, Jupyter, Deep Learning*** Aug 2021 - Dec 2021

- Implemented a deep neural network with 16 Residual Blocks, and a Generator-Discriminator pair to upsample low resolution images by a factor of 4, using TensorFlow 2 and Keras
- Trained the neural network for 50,000 steps using test/train splits to handle ~ 10GB datasets efficiently

Vice Captain and Design Lead - Hawkz Racing Formula Student Team **Chennai, IN**
SRM University | ***Skills Used: ANSYS, CATIA, SolidWorks*** 2017 - 2018

- Successfully managed a team of 30 people, working across multiple departments, to secure National Awards in Sales and Business Presentation, along with a National Rank of 4 at the Design Presentation, to gain valuable leadership experience.
- Oversaw the development of core vehicle components (Wheel assembly, Differential and Engine Mounts, Chassis), from design through to manufacturing and assembly.

Experience

Battery Thermal Simulation Intern **Chennai, IN**
Grinntech Motors and Services - IIT Madras | ***Skills Used: ANSYS (FLUENT, MECHANICAL), SolidWorks*** Jun 2018

- Performed CFD and Heat Transfer simulations for different temperature ranges to analyze the Solidification/Melting of Phase Change Material as Thermal Management system for Battery Module

Research Intern - Aerodynamics **Kanpur, IN**
IIT Kanpur - Non Equilibrium Flow Simulation Lab | ***Skills Used: ANSYS (FLUENT, ICEM, MECHANICAL), PuTTY, HPC*** Jun 2018

- Utilized grid adaptation techniques and performed mesh independence studies to simulate fluid flow through a CD Nozzle with supersonic jet control to study mixing characteristics of the plume with the atmosphere.