VIGNESH SUNDARARAJAN

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Education

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

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

System of Systems Engineering study of Space Traffic Management **West Lafayette, USA**
Purdue University | ***Skills Used: Agent Based Modeling, Taxonomies, Planning & Organization*** Jan 2022 - Present

- Working on an intensive course project to model Space Traffic Management as an SoS in MATLAB, by utilizing DAI(Design-Abstraction-Implementation) principles

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

- Implemented a Line Follower and PID controller module, using Python, for a 4 wheeled autonomous robot running ROS Noetic on a Raspberry Pi, by utilizing OOP (Object Oriented Programming) principles.
- Wrote a Ball Tracking and Chasing algorithm in Gazebo with Python, by using Computer Vision principles such as Image Masking, Canny Edge Detection, and centroid calculation using Moments.
- Upcoming work involves implementing the A^* algorithm for trajectory optimization and SLAM

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, and presented results to the team leads and other members through extensive written documentation on Confluence

Responsive Website Design - Portfolio **West Lafayette, USA**
Purdue University | ***Skills Used: HTML, SCSS, Javascript, JSON, Version Control (Git), UI and User Experience*** Dec 2021

- Created a responsive portfolio website detailing all projects and relevant information using the Hugo Static Site Generator, HTML, Javascript, and CSS for visualization.
- Maintained a repository using Git version control on GitHub to efficiently deploy changes to the website

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

- Implemented a Deep Generative Adversarial Network, having 16 Residual Blocks and a Generator-Discriminator pair, performing Unsupervised Learning with a Supervised Loss Function for image super-resolution using TensorFlow 2 and Keras
- Trained the neural network for 50,000 steps using test/train splits to handle ~ 10GB datasets efficiently and visualized the results using matplotlib

Vice Captain and Design Lead - Hawkz Racing Formula Student Team **Chennai, IN**
SRM University | ***Skills Used: ANSYS, CATIA, Leadership, Problem Solving, Automotive, Research and Development*** 2017 - 2018

- Successfully managed a team of 30 people, working across multiple departments (powertrain, chassis, vehicle dynamics, business), to secure National Awards in Sales and Business Presentation, along with a National Rank of 4 at the Design Presentation
- Oversaw the development and integration of core vehicle components from design through to manufacturing and assembly.

Experience

Research Intern - Aerodynamics **Kanpur, IN**
IIT Kanpur - Non Equilibrium Flow Simulation Lab | ***Skills Used: ANSYS (FLUENT, ICEM, MECHANICAL), PuTTY, HPC*** Jun 2019

- 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.