VIGNESH SUNDARARAJAN

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Education

Purdue University | Master of Science - Aeronautics and Astronautics — **West Lafayette, USA**
Relevant Coursework: *Artificial Intelligence, Autonomous Systems, System of System Modeling and Analysis, Multidisciplinary Design Optimization*, Space Flight Operations*, Scientific Computing** — 2021-Present

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

Skills

Programming: C++, Python, Java, SQL, MATLAB, HTML, CSS, LaTeX
Frameworks/Libraries: Tensorflow/Keras, PyTorch, Scikit-Learn, Matplotlib, Pandas, Plotly, Flask
Developer Tools: AWS, Spark, MySQL, Git, Vim, Linux, CMake, Jupyter, ROS, Gazebo, Docker, Kubernetes, Confluence, Jira

Experience

Machine Learning Research Intern | John Deere - Purdue Data Mine — **West Lafayette, USA**
Tools Used: *AWS, Python, SQL, Spark, Computer Vision, Geospatial Data Analysis* — Aug 2022 - Present

- Upcoming Project starting Fall 2022
- Developing an automated, large scale system to identify wildlife conservation opportunities for a non-profit through a large-scale, automated system that ingests satellite data and produces profitability maps in ARCGIS for agricultural planning

Data Analytics Intern | Dauch Center for the Management of Manufacturing Enterprises — **West Lafayette, USA**
Tools Used: *AWS, Python, SQL, Pandas, Plotly, Geopy, Telematics* — Jun 2022 - Aug 2022

- Wrote Python software to visualize high-traffic trucking hubs across North America for a national client, based on fleet GPS data and reduced computation time by 6000% compared to the existing baseline.
- Developed an efficient and modular data pre-processing workflow for cleaning raw Telematics data of the order of 100GB, using Python, Pandas and SQL.

Projects

Ball Tracking and Chasing Robot using ROS and Gazebo — **West Lafayette, USA**
Tools Used: *Python, ROS, OpenCV, Linux, Computer Vision* — Jan 2022 - Apr 2022

- Performed Image Masking on a real-time RGB video stream to ID the object and then calculated distance by finding the centroid using the moments method
- Wrote a proportional controller for the robot's velocity that checks if object is in the robot's FOV before proceeding. Simulated the algorithm in Gazebo

Study of Space Traffic Management as an SoS — **West Lafayette, USA**
Tools Used: *Agent Based Modeling, Verification and Validation, Systems Engineering* — Jan 2022 - Apr 2022

- Utilized DAI principles to develop an initial ConOps for the Space Traffic Mangement SoS. Developed performance metrics for a number of design variables in the NASA STM SoS proposal for Verification and Validation in an agent based model
- Implemented an Agent Based Model using AnyLogic to determine the optimal number of spacecrafts in orbit while maintaining a high mission success probability.

Image Super-Resolution using a GAN with a Perceptual Loss Function — **West Lafayette, USA**
Tools Used: *Python, Tensorflow/Keras, Matplotlib, Numpy, Pillow* — Jan 2022 - Apr 2022

- Implemented SRGAN, based on the ResNet architecture(16 Residual Blocks with skip connections), with a perceptual loss function that uses high level feature maps of the VGG network
- Trained the neural network for 50,000 steps on the DIV2K data set and visualized the 4× upsampled images using matplotlib

Aerodynamics Team Member | Purdue Electric Racing — **West Lafayette, USA**
Tools Used: *ANSYS, SolidWorks, Fusion 360, Confluence, Jira* — Aug 2021 - Aug 2022

- 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