Nishan Srishankar, nsrishankar@wpi.edu (774)-408-0817
Novel Engineering for Swarm Technologies (NEST) Lab, WPI Github.io, Linkedin, Google Scholar

Objective

Seeking position in Computer Science/ Robotics to apply skills gained through previous work experience to real-world challenges with meaningful impact.

Education

Worcester Polytechnic Institute (WPI), Worcester, MA Ongoing
MSc., Robotics Engineering and Electrical & Computer Engineering (swarm robotics & DL)

Worcester Polytechnic Institute (WPI), Worcester, MA May 2015
BSc., Mechanical Engineering (minors: Aerospace, Electrical Engineering)

Research/Internship Experience

Graduate Student Researcher Sep 2016 - present
Novel Engineering for Swarm Technologies (NEST) Lab, WPI, Worcester, MA

- Novel research into decentralized collective spatial-perception & decision-making of environmental features using an anonymous swarm of robots given real-world constraints such as memory limitations and sensing noise as well as adversarial agents. Youtube Link.
- Obtained versions of statistically significant algorithms through running and analyzing gigabytes of experiment data using a high-performance computing cluster.

Machine Learning Researcher June 2020 - Sep 2020
NASA/ SETI Institute Frontier Development Lab, Mountain View, CA

- Implementing representation encoder using self-supervision on remote sensing imagery for Knowledge discovery of interesting/anomalous phenomena and for augmenting multispectral data. Youtube Link

Strategic Research Intern Jan 2020 - Sep 2020
Honda Research Institute, San Jose, CA

- Researching explainable AI and interpretable relation modeling with graph neural networks in the application of driving style characterization.

Graduate Student Intern Aug 2019 - Jan 2020
WPI & Army Research Laboratory, WPI, Worcester, MA

- Implemented a full-stack deep learning pipeline for analyzing and visualizing corrosion experiments for DoD sustainment using a small, real-world dataset.

Research Programmer Nov 2018 - Jan 2020
DARPA Warfighter Analytics for Smartphone Healthcare, WPI, Worcester, MA

- Reviewed 'in-the-wild' datasets collected using smartphones & implemented/analyzed state-of-the-art networks used to classify day-to-day actions.
- Working on domain adaptation from a scripted study to clean temporal skew present in the original dataset.
- End-goal of creating a Deep-Learning pipeline that can manipulate/engineer features obtained using a smartphone sensor suite to detect anomalous behavior from traumatic brain injuries in soldiers.

Publications

- Chen Tang, **Nishan Srishankar**, Sujitha Martin, Masayoshi Tomizuka, Towards Explainable Autonomous Driving with Grounded Interpretable Relational Inference, NeurIPS ML4AD, *In submission T-RO*
- Nathalie Majcherczyk, **Nishan Srishankar**, Carlo Pinciroli, Flow-FL: Data-Driven Federated Learning for Spatio-Temporal Predictions in Multi-Robot Systems, *In submission RA-L*
- Indhu Varatharajan*,Valentin Bickel*, Daniel Angerhausen*, Eleni Antoniadou*, Shashwat Shukla*, Abhisek Maiti*, Ross Potter*, **Nishan Srishankar***, Frank Soboczenski*, Carl Shneider*, Michelle Faragalli*, Mario D'Amore*, Artificial Intelligence for the Advancement of Lunar and Planetary Science and Exploration, Planetary Science and Astrobiology Decadal Survey 2023-2032

- Adnan Munawar, **Nishan Srishankar**, Loris Fichera, Gregory Fischer, Multi-Manual Grasping and Interaction in Real-Time Dynamic Simulations using a Penalty Based Approach, International Conference on Robotics and Automation-ICRA 2020
- Adnan Munawar, **Nishan Srishankar**, Gregory Fischer, An Open-Source Framework for Rapid Development of Interactive Soft-Body Simulations for Real-Time Training, International Conference on Robotics and Automation-ICRA 2020

Project Experience

Independent Projects

- Implemented speed-prediction from a dashboard video stream (Comma-AI challenge using C3D and CNN-LSTM networks), Char-RNNs and LSTMs to generate Harry Potter pages, GANs, adversarial image classification for fooling NNs, Kaggle competitions (satellite image classification), distributed neural networks & federated machine learning for swarm robots.

Self-Driving Car nanodegree, Udacity

- Formulated lane-line detection algorithms (using Canny-Edge detection, Region-of-Interest determination, perspective transformations, and polynomial fitting) from a car dashboard video feed.
- Developed Deep Learning projects such as traffic sign classification using custom neural networks, behavioral cloning using an end-to-end network after creating and augmenting a custom dataset, and Semantic segmentation of free road space using the KITTI dataset. Youtube Link.
- Created a vehicle detection and tracking pipeline using a dashboard camera using generated features and SVMs (improved by an ensemble network) and further modified using YOLOv2 for real-time tracking.

Multi-Robot Systems

- Utilized an overhead wide-angle camera, Aruco tags, and OpenCV for pose estimation to control a system of 'blind' Sparki robots for cooperative manipulation/sorting of bulky objects. Youtube Link.
- Created an emergent flocking algorithm to have the Sparki robot system re-orient and move towards a moveable goal location while ensuring obstacle/collision avoidance.

Robot Dynamics

- Analyzed and prototyped a modular directional haptic feedback device for the da Vinci surgical system to provide sensory input to a surgeon in addition to visual feedback. Youtube Link.

Skills

Engineering Techniques: Distributed Systems, Optimal Control, Deep Learning (Computer Vision, Time-series, Unsupervised/Semi-supervised/Self-supervised learning), Deep Reinforcement Learning, High-Performance Computing/Slurm, Google Cloud Platform, AWS
Programming Languages: Python, C++, Matlab, Julia
Frameworks and Software: ROS, Gazebo, OpenCV, OpenRAVE, Tensorflow, Keras, PyTorch

Awards & Services

- AIAA, AAMAS, NEURIPS, IEEE-RAL, CDC Junior reviewer — Aug 2016 - present
- ICRA 2016 Formal Methods in Robotics Scaling Chain of Integrators Winning team — May 2016
- WPI International Scholarship & Dean's List — Aug 2011 - May 2015
- Tau Beta Pi (Engineering Honor Society) — June 2012 - present
- Edexcel Challenge Trophy (Best Academic Results, Valedictorian) — 2011

Teaching Experience

Graduate Tutor/Grader

- Artificial Intelligence — Fall 2018
- Introduction to Communication & Networks — Spring 2018
- Analysis of Probabilistic Signals/Systems — Fall 2017
- Principles of Communication Systems — Fall 2017
- Optimal Control — Spring 2017