Sridhar Thiagarajan

www.sridhartee.blogspot.com
www.github.com/sritee

Curriculum Vitae
ONID 933603593

Interests

- Reinforcement Learning, Machine Learning, Applied Convex optimization

Education

- **Oregon State University** *Sept 2018 -*
  M.S in Robotics, MIME
- **SSN College of Engineering, Anna University** *Aug 2014 - 2018* [1]
  (Mechanical Engineering, GPA: 8.31/10)
  - Statistics and Numerical Methods (A)
  - Linear Algebra (Mathematics-1) (A)
  - Transforms and Partial Differential Eqs. (A)
  - Engineering Mechanics (S)
  - Basic Electrical and Electronics (A)
  - Calculus (Mathematics-2) (B)
  - Electrical Drives and Controls (A)
  - Computer Programming Lab (S)

Research Experience

- **Reinforcement Learning for Autonomous Steering Control** [report] *Dec-Feb 2017*
  Mentored by Sanjeev Sharma, Swaayatt Robots
  - **Goal**: Investigate Policy gradient methods and value function based methods for continuous control of a real dynamical system, and explore challenges of learning directly on a real world system.
  - Involved integration of multiple real-time sensors on vehicles using ROS, and formulation of MDP framework for following perceivable trajectories.
  - Currently extending our work by following the output of motion planner rather than perceivable trajectories
- **Autonomous Beach Cleaning Robot** [report] *Feb-May 2017*
  Mentored by Dr.G Satheesh Kumar, SSN
  - **Goal:** Make a fully functioning prototype of an autonomous beach cleaning robot, using camera input for litter detection. Worked in a team of three.
  - Published at *International Conference on Machine Intelligence and Signal Processing (MISP-2017)*, conducted at IIT-Indore
  - Challenge was to maximize metrics like (recall), keeping in mind computational feasibility and real time constraint
- **Machine Learning Intern, IIITD** *Ongoing*
  Mentored by Dr.Chetan Arora, IIIT Delhi
  - **Goals:** 1)Study, implement and make possible improvements of methods to perform imitation learning from egocentric videos 2) Design Adaptive traffic light controllers using reinforcement learning
  - Designed RL based traffic light controller, compared to non-adaptive baseline controllers for various traffic scenario on a pygame simulator. Finalized average wait time as reward and used Q-learning with fourier basis for function approximation. [poster]
  - Exploring LSTM based controllers for summary of expert demonstration, and effect on generalisation to new instances during test time. Simulated control scenarios in Gazebo for learning from demonstrations.
- **Options framework for Autonomous Vehicles** [report] *Summer 2016*
  Independent Work
  - **Goal**: Study and analyze hierarchical reinforcement learning methods, and application of the same to autonomous vehicle overtaking scenario
  - Implemented several research papers in options framework and option discovery, and proposed a framework for this to integrated into RL based autonomous vehicles
  - Made a simulator using Pygame to test the framework, and explore scalability to real time systems

[1] S: 91-100, A: 81-90

Other Projects

- **Gesture Detection based Service Robot :** Work published at *International conference on Advancements in Automation, Robotics and Sensing (ICAARS 2016)*. Lead author in a team of 6. Involved modelling and segmentation of hand gestures using machine learning techniques. Built and incorporated it as a part of a service robot, which also used methods for localization.
- **Kickstarter Campaign Sucess Prediction**- ML feature engineering contest, testing data modelling and feature engineering approaches. Managed 18th place out of around 450 submissions. [gist]

Technical Background

- **External Proctored Exams:** (i) Machine Learning (ii) Reinforcement Learning, (iii) Nonlinear Programming, conducted by NPTEL, both involving online assignments as well as proctored exams. Topped all three classes involving 153, 4 and 33 students respectively, e-verifiable - **here**
- **Independent Study:** CM Bishop: Pattern Recognition, Convex optimization (Boyd and Vandenberghe, Chapter 1-8), Reinforcement learning (Richard Sutton)

Artificial Intelligence Blog (May 2016 - Present)

- Web portal for sharing implementations and thoughts on various topics and research papers in the field of AI, mainly RL and ML. My attempt at helping fellow researchers tweak and experiment with various parameters and environments. Gets an average of around 25 visits a week. Contains some tutorials to introduce concepts from the books I have read, along with Code Eg: ***Stochastic Policy Gradient Methods***

Teaching Experience

- **Conducted *Introduction to Robotics* Workshop** *Aug 2016,Nov 2017*
  Robotics Club of Mechanical Department, SSN College of Engineering
  - Part of team of 5 which introduced the fundamentals of robotics to department freshmen. Workshop consisting of practical hands-on session making basic robots, with an added session to inform students of the various frontiers of the field.
- **Teach A School Volunteer** *May 2016*
  Kotturpuram,Chennai
  - Involved assisting primary school children in their quest to improve language proficiency during their summer holidays.

Skills

- *Programming*: Python, C++, MATLAB
- *Solvers/Libraries/Software*: CVX, ROS, Gazebo, TensorFlow, OpenCV, LaTeX

Miscellaneous

- Head of Sponsorship Committee: SSN Cube Open, a national level speedcubing competition. Responsibilities involved contacting sponsors and arranging briefings about advertising avenues.
- Head of Technical Team, Robowars : Involved constructing arena with automated scoring system, using photoresistors, lasers, digital display and Arduino
- Offered INSPIRE Scholarship for securing top 1% in India in CBSE examinations, Grade 12
- Offered SSN Student Research Grant
- Hobbies: Cycling, Reading, Blitz chess, Carnatic music