1117 Anthrop Dr, #4
West Lafayette IN 47906

Kumaraguru Sivasankaran

+1-765-606-1594
ksivasan@purdue.edu

Education

West Lafayette, USA **PURDUE UNIVERSITY** **December 2018**

- Masters in Aeronautics and Astronautics Engineering. Major: Dynamics and Control. GPA: 3.88/4.
- Minor in Computational Science and Engineering
- Graduate certificate in Applied Statistics
- Focus areas: Linear, Non-linear and Distributed control, Optimal Control and Estimation, Machine learning, Deep learning, Graphical models, Parallel computing, Reinforcement learning, Computer vision.

Chennai, India **COLLEGE OF ENGINEERING GUINDY, ANNA UNIVERSITY** **Aug 2010 – May 2014**

- Bachelors in Mechanical Engineering. GPA: 9.4/10. (Ranked 3^{rd} in overall batch)

Masters Research

Advisor: Professor Xiao Wang **DEPT. OF STATISTICS** **Jan-Dec 2018**

- Exploring the idea of aggregation from a distributional perspective for vision based control applications.
- Currently focused on extending the success of Hierarchical Reinforcement learning and Bayesian optimization.
- Investigating algorithms for improving sample efficiency and computational efficiency through abstraction.

Professional Experience

Research Assistant **CMSC, PURDUE UNIVERSITY** **Jan-Dec 2018**

- Lead member for Technical Cost Modeling of Scalable Manufacturing of Aware and Responsive thin films.
- Developing an optimizer for project evaluation among different options at product development stage.

Project Manager **MINORITY ENGG PROGRAM, PURDUE UNIVERSITY** **June-July 2018**

- Mentored a class of 30 incoming freshman to Design, Test, Race a go-kart as part of Summer boot camp.
- Designed the curriculum and class exercises, managed logistics, provided individual feedback on final report.

R&D, Intern **VOLVO GROUP TRUCKS, USA** **Aug 2017-Dec 2017**

- Performed verification and validation of control systems on 13-litre Turbo Compound Diesel Engines.
- Proficient in ECU calibration and data acquisition using ATI Vision and troubleshooting using CAN Analyzer.
- Worked on improving the fidelity of powertrain model developed in Simulink for creating Virtual Test Cell.

Field Service Manager (F.T) **DAIMLER TRUCKS ASIA** **July 2014-July 2016**

Roles and Responsibilities: Technical support and Troubleshooting, Field product support, New product monitoring, Warranty management, Service marketing, CSI activities, Dealer management, 24*7 Customer care

- Managed technical support to 13 models of BB trucks ranging 9-49 tonnes with 200+ customers in the region.
- Conducted on-road fuel efficiency tests in the new range of BB trucks (3723R) for establishing performance.
- Over 1000 hours of hands on experience with vehicle troubleshooting using onboard diagnostic (OBD) tools.

Research, Intern **IIT-MADRAS** **Summer 2013**

- Studied parameter estimation for an unsteady heat transfer problem using Bayesian inference and Markov Chain Monte Carlo sampling techniques.
- Developed a MATLAB program to analyze the effect of a priori model on the performance of the algorithm using Metropolis Hasting sampler and Gibbs sampling at different noise levels in the measured data.

Technical projects

- **Reinforcement learning for Control of Microrobots** through Local Potential Fields (2018): We employed RL algorithms including SARSA, Deep Q-learning for an optimal path problem in stochastic environments.
- **MIT DeepTraffic** (2018): Hyper-parameter tuning in deep reinforcement learning to drive a multi-agent vechile system under simulated environment using DQN algorithm. Highest Ranking 848* out of 20981.
- **Parallel computing** (2018): Comparison study on various parallel architectures including multi-GPU multi-CPU for a classic n-body problem using OpenMP, MPI, CUDA.
- **Decision support tool** (2017): Improved the accuracy of a decision support system to 85% which is developed to assist air traffic controllers to issue conflict resolution. Implemented using Multi-class SVM and Ensemble models in MATLAB.
- **Recommendation system** (2017): Studied the state-of-the-art algorithms in the area of non-negative matrix factorization (NMF) and implemented SGD based recommendation system in Python using Surprise library.
- **Decentralized control** (2017): Designed a hybrid distributed controller using Target point control approach for a two agent case as an approach towards decentralized autonomous traffic control.
- **Model-Reference Neural Network Controller** (2017): Successfully implemented a neural network based controller for a non-linear, single link robot arm using MATLAB Machine learning toolbox and Simulink. The plant model was identified first, and then the controller was trained so that the plant output follows the reference model.
- **Object detection** (2017): Implemented YOLOv2 algorithm for car detection, the then state-of-the-art object detection algorithm using Convolutional Neural Networks.
- **Transfer learning** (2017): Implemented a Neural Style Transfer algorithm using pre-trained weights from VGG-19 network to create artistic style images (similar to Prisma).
- **Optimal path planning** (2016): Developed a Genetic Algorithm based robust optimal path selection program for Unmanned Aerial Vehicles (UAV) and compared the performance against A* algorithm in MATLAB.

Short Term Courses, MOOCs and Certificates

2018 Fundamentals of Accelerated Computing with CUDA, Deep learning Institute, NVIDIA
2018 Deep learning Specialization by Prof. Andrew Ng, Stanford University (4/5 completed)
2018 Reinforcement learning by Prof. David Silver, UCL
2018 Modern Performance Based Navigation Systems by Dr. Ivan Ostroumov, Fulbright Scholar
2017 Introduction to Statistical Machine Learning using R by Prof. Trevor Hastie and Prof. Rob Tibshirani
2017 Probabilistic Graphical Models by Prof. Daphne Koller, Stanford University (2/3 completed)
2016 Control of Mobile Robots by Prof. Magnus Egerstedt, Georgia Tech

Leadership and Awards

President, Students Quality Club, Anna University (2013–2014): Managed the overall activities of the club and handled funds worth INR 1 million for various activities like guest lectures, industry visits, workshops, value addition programs and quality circles. Headed a team of 200+ active members and mentored incoming juniors.
The Banco Foundation Prize: Awarded for consistent academic performance for the year 2012-2013.
Central Sector Merit Scholarship: Awarded by Ministry of HRD, Govt. of India for academic excellence.

Technical skills and Exposure

Languages	Python, MATLAB, C, Unix, C++
Statistical tools	R, SAS, SAS Enterprise miner, Tableau
Parallel Computing	OpenMP, MPI, CUDA
Controls	Simulink, CVX, ROS
Libraries	Scikitlearn, Tensorflow, Keras, PyTorch, OpenCV, OpenAI gym, Jupyter