Ramanan Sekar, Robotics Grad. Student

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Seeking Full-Time positions in Machine Learning, Deep Learning, Robot Learning
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Education

- **University of Pennsylvania** — Philadelphia, PA
  Masters in Robotics; GPA: 4.00 — *Aug 2018-May 2020 (Exp)*
- **Anna University** — Chennai, India
  Bachelor of Electrical Engineering; GPA: 3.9 (8.89/10.0 - top 1% of Graduating Class) — *Aug 2014 - May 2018*

Skills Summary

- **Languages**: Python, C++, C, MATLAB
- **Machine Learning Tools**: Tensorflow, PyTorch, Keras, Scikit-Learn, Matplotlib
- **Tools**: Git, Docker, OpenCV, NumPy, MuJoCo, OpenAI Gym,LaTeX, TensorRT (beginner)

Experience

- **Qualcomm** — Bridgewater, NJ
  Deep Learning Research Intern, Qualcomm Corporate R&D — *May 2019 - August 2019*
  - **Decoding with Recurrent Neural Networks**:
    - Designed large, custom recurrent and neural networks for decoding signals on graphs
    - Implemented vectorized Tensorflow code and a modular,scalable codebase for high frequency design iterations. Produced a completely reproducible codebase by attacking Non-determinism problems in GPU processing
    - Performed Meta-Training distribution selection for transfer learning across distributions
    - Scaled performance to full scale models and achieved better performance than baselines with the developed method
- **Berkeley AI Research, GRASP Lab** — UC Berkeley, UPenn
  Master's Thesis Research *- with Deepak Pathak and Kostas Daniilidis* — *Aug. 2019 - Present*
  - **Multi-Task Planning with Model Based Reinforcement Learning**: Working on a vision based Multi-Task Robot Learning problem from with model based learning from pixels. Using a curiosity metric to explore environments with PPO, and using a CEM planner to generate policies on the learnt model. Learnt model performs video prediction
- **GRASP Lab, University of Pennsylvania** — Philadelphia, PA
  Research Assistant *- Prof. Kostas Daniilidis' Group* — *Nov. 2018 - Present*
  - **Prediction Error For Robot Exploration in RL**: Contributed to developing a C-VAE based perception module for future prediction. Used this module to give robots intrinsic motivation to explore large environments, running on PPO. Designed 3D simulations of the Baxter robot to test code. Published work in RSS 2018
  - **Unsupervised Few-Shot Classification with Meta-Learning**: Developed a novel meta-learning based few-shot unsupervised classification module with MAML, using a novel CNN + MLP architecture, in Tensorflow. Used Bayesian Optimization to tune hyperparameters. Achieved similar performance with 85% less labelled data
- **University of Pennsylvania** — Philadelphia, PA
  Teaching Assistant *- Machine Learning (Spring 2019, Fall 2019)* — *Jan 2019-May2019, Aug.2019-Present*
  - **TA for CIS 520: Machine Learning, CIS 519: Applied Machine Learning**: Teaching Assistant for graduate level machine learning courses focusing on both theory and applications. In charge of designing homeworks, conducting office hours, grading and project feedbacks.
- **Indian Institute of Technology** — Madras, India
  Robotics Research Intern — *Dec 2016 - April 2018*
  - **New Kalman Filter Algorithm for efficient Localization**: Developed a novel KF algorithm using correlations between measurements, proved superiority to original EKF, and validated on a Mobile Robot using SONARs. Achieved Faster and accurate convergence
  - **New Sensor Fusion Algorithm**: Developed a new efficient sensor fusion algorithm using Maximum likelihood estimators and measurement noise correlations. Achieved optimality, and an error reduction of 70% compared to existing methods

Selected Projects

- **Qualcomm's Hackathon: Unsupervised Depth Estimation**: Developed a real-time unsupervised monocular depth estimation system with TensorRT, with off-the-shelf object detection modules, for vision based navigation guidance for blind people
- **Multi-Robot Vision based Collaboration**: Designed an Aerial and Ground mobile robot collaboration with SURF based aerial imagery stitching and SIFT based object detection for ground robot motion planning with PRM