Prabhasa Kalkur

(979) 676-6881 | prabhasa.94@gmail.com
GitHub, LinkedIn, Webpage

SKILLS

Programming Languages: Python | MATLAB | C | C++ | R | SQL
Software, Design, and Analytic Tools: MS Office | LaTeX | Git | Tableau
ML Frameworks: TensorFlow (TF) | PyTorch | Keras | Scikit-Learn
RL Libraries: Stable Baselines 2.0 | RLLAB | RLLib

EDUCATION

Texas A&M University (TAMU), College Station, Texas — **Dec 2020**
Master of Science in Electrical Engineering — **GPA:** 3.9/4.0
R.V. College of Engineering, Bengaluru, India — **May 2016**
Bachelor of Engineering in Electronics and Communication — **GPA:** 4.0/4.0

WORK EXPERIENCE

Learning from Demonstrations: Applications to Autonomous UAV Landing & Minecraft
Master's Thesis under Prof. Dileep Kalathil, Dept. of ECE, TAMU, USA, Oct 2019 – Oct 2020

- Used sample-efficient imitation learning to learn behaviors of sparsely rewarded real-world systems.
- Designed a novel method of autonomous UAV landing using human demonstrations (Python, TF).
- Captured pilot's intuition to navigate and land drones on a ship deck simulated in Microsoft AirSim.
- Achieved imitation accuracy of 84% with just 10 demonstrations of task. Short video of training here.
- Visualized results with Weights & Biases, available here. Link to thesis and slides available here.

Project Assistant, Code Design and Analysis Lab, Indian Institute of Science, Nov 2017 – July 2018

- Routing and task-scheduling of robots for simultaneous pickup and delivery of goods, in simulation.
- Compared performance of metaheuristic algorithms on Vehicle Routing Problem (VRP) variants.
- Applied Genetic and Greedy algorithms to Capacitated VRP and VRP with time windows (Python).
- Demonstrated 2x reduction in traversal of 12 vehicles to pick and deliver goods at 50 locations.

Project Assistant, Signal Processing & Comms Lab, Indian Institute of Science, July 2016 – Oct 2017

- Addressed 'uncertainty' of device self-localization in indoor environments, using reference beacons.
- Leveraged group testing, order statistics to derive bounds on localization uncertainty and accuracy.
- Monte Carlo studies showed uncertainty reduces exponentially with beacons, and probability of accurate localization increases exponentially with beacon density (MATLAB). Abstract of paper here.
- Achieved >96% accuracy with <1% uncertainty in localizing within a 10m x 10m area using 5 beacons.
- Extended the problem to an outdoor setting, where energy-harvesting beacons are used.

PROJECTS

Tracking COVID-19 development in USA, Nov 2020

- Visualized trend and concentration of COVID-19 cases and deaths in US states. Viz here.
- Observed rising trend in states with highest number of cases: California and Texas. Viz here.

MineRL Competition: NeurIPS 2020, Texas A&M University, USA, Aug 2020 – present

- Developing sample-efficient algorithms using human demos to perform tasks in the Minecraft game.
- For the task of chopping trees, Reinforcement Learning (RL) algorithms trained on demonstrations from the MineRL dataset performed 10x better than vanilla RL algorithms (Python, PyTorch).

The passive chicken and aggressive car problem, Texas A&M University, USA, May – Aug 2019

- Leveraged pedestrian-vehicle interaction at intersections to induce 'passive-aggressive' behavior in autonomous vehicles. Learned car behavior by training on random pedestrian profiles, used Inverse Reinforcement Learning to recover pedestrian utility. Employed Duckietown for simulations (Python).
- Pedestrian backs off, waits before proceeding, and car accelerates/decelerates accordingly.

RELEVANT COURSES

Analysis of Algorithms, Machine Learning, Reinforcement Learning, Probabilistic Graphical Models, Probability Theory, Game Theory, Stochastic Systems, Intro to optimization, Signals & Systems.

LEADERSHIP

Indian Graduate Student Association (IGSA): VP of Editorial & Mentoring, TAMU, Oct 2018 – May 2020
ECE Graduate Student Association (ECE-GSA): External Officer, TAMU, Oct 2018 – Oct 2019. Article here.