Aseem Saxena

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EDUCATION

Oregon State University Corvallis, OR
M.S in Artificial Intelligence | GPA: 3.89/4.0 Mar '21 - Expected Jun '24
Courses: Reinforcement Learning, Deep Learning, Algorithms, Optimization, Probabilistic Graphical Models
*Research: **Offline RL, Multi-Task Learning, AI Safety, Bipedal Robots***

Birla Institute of Technology and Science, Pilani India
B.E in Electrical & Electronics Engineering, M.S in Biological Sciences (Dual Major) 2011- 2016

SKILLS

Programming: Python (10+ years exp.), MATLAB (9+ years exp.), C/C++ (9+ years exp.), JAVA (9+ years exp.)
Software and Libraries: PyTorch, OpenCV, ROS, Mujoco, TensorFlow, Git, Gazebo, Point Cloud Library, Docker, Ray, Isaac

EXPERIENCE

Oregon State University *Graduate Research Assistant, Prof. Alan Fern* Jun '21 – Present

Offline RL

- We study how different farmer strategies work across different farms (without access to a simulator) via learning a Multi-Dynamics World Model and show that this World Model incurs negative interference under limited data, undermining generalization. ***Pytorch, World Models, Crop Simulators, Model-based Off-Policy Evaluation***

Multi-Task Learning

- Developed a model for Grape Cold-Hardiness Prediction that consistently outperforms the state-of-the-art scientific model with just thirty seasons of data for any cultivar. Our work is deployed on **AgWeatherNet** which is used daily by 14K subscribers. Submitted to ML Journal [1] and published at AIAFS 2023[2] and IAAI 2023[3]. ***Pytorch, RNNs***

Sim2Real RL for Bipedal Robots

- Developed an RL formulation for training dynamic gait controllers that can respond to specified touchdown locations. Published at IEEE ICRA 2022. Trained a Deconvolution decoder to learn transitions[4] ***Pytorch, Mujoco***

AI Safety

- Proposed a formal criterion for avoiding side effects in environments and demonstrated its effectiveness via evaluation on gridworlds. Published at NeurIPS ML Safety Workshop 2022. [5] ***Pytorch, AI Safety Gridworlds***

Teaching

- Systems Dynamics and Control, Fall 2021 with weekly office hours and evaluation duties.

Panasonic Singapore *AI Engineer, Technology Innovation Team* Jan '19 – Jan '21

- **Bayesian Optimization** for **Material Design** - With just a single trial, obtained a material having properties similar to another material obtained with over 20 trials conducted in a period of 2 years. ***Pytorch, Gaussian Processes***
- **Edge Deployment** of Deep Learning Models - Successfully deployed deep vision models on dated Android TV boxes with lower computational resources, achieving a 30 FPS. ***Pytorch, OpenCV, TensorFlow, Android 6.0, ONNX***
- Real-time **Multi-Object Tracking** - Developed a 50+ FPS tracker using Kalman Filters for state estimation and Hungarian algorithm for data association. Tracker deployed on test run in a busy retail shop. **OpenCV**, ***C++***
- Deep Learning for **Gaze Estimation** - Trained a robust gaze prediction model entirely on synthetic images, fine-tuned on real images and successfully deployed on a beta trial in a busy retail shop. ***Unity, Pytorch***

National University of Singapore *Research Staff, Prof David Hsu* Jan '17 – Jun '18

- Autonomous Driving in a Crowd by **Learning from Tree Search** - Published at RSS 2019. [6] ***Pytorch, C++, Unity***
- Developed a feature rich **visualization tool** to debug **QMDPNet**, an approx. POMDP Solver. ***TensorFlow, Tkinter***
- Developed a **robust position and velocity controller** for the Fetch Robot for indoor navigation. ***ROS, C++***

Ducere Technologies, India *Computer Vision Engineer* Jul '16 – Apr '17

- Developed a **Low cost 3D LiDAR** system using Teraranger One ToF sensor on a pan-tilt unit. ***Point Cloud Library***

IIIT Hyderabad, India *Research Staff, Prof Madhava Krishna* Apr '17- Jul '17, Jun '15 – Jul '16

- Developed a robust system for **traffic sign detection, recognition and tracking** as part of a driverless car challenge for Indian automobile manufacturing company - Mahindra. Deployed and tested on a car. ***OpenCV, C++***
- **Learning** based approach for **Visual Servoing -** Published at ICRA 2019. [7] ***Caffe, OpenRAVE, MATLAB***

COURSE PROJECTS

- Avoiding Side Effects in Complex Navigation Environments via Multi-Task Learning **[Slides]**
- Distributed Q-Learning with Ray Framework **[Code]**
- Offline-RL for Bipedal Robots **[Report]**
- Studying Robustness of Semi-supervised Visual Features to Adversarial Attacks **[Report]**
- MC Dropout for Efficient RL Exploration **[Report]**

EXTRACURRICULAR Musician **[Youtube]**, Amateur Triathlete **[Certificate]**