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: Multi-Task Learning, Bipedal Robots, AI Safety, Forecasting, Offline RL

Birla Institute of Technology and Science, Pilani India
B.E in Electrical & Electronics Engineering, M.Sc in Biological Sciences (Dual Major) '11- '16

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

- **Multi-Task Learning -** Developed a model for Grape Cold-Hardiness Prediction that outperforms the state-of-the-art scientific model with just thirty seasons of data.
  - Our work is deployed on AgWeatherNet which is used monthly by 14K subscribers.
  - Our flexible framework is applied to other crops and their properties such as cherries, grape bud-break.
  - **[ML Journal]**(Under Review), **[AIAFS 2023]**(Accepted), **[IAAI 2023]**(Accepted). *Pytorch, RNNs*
- **Sim2Real RL for Bipedal Robots** - Developed RL controller for generating gaits to reach goal foot locations.
  - Transferred to the real world from simulation via randomizing the parameters of the simulation.
  - Trained a model to accurately check if a footstep is feasible. Published at **[ICRA 2022]**. *Pytorch, Mujoco*
- **AI Safety -** Proposed a Formal Criterion for avoiding Side Effects, demonstrated its effectiveness on gridworlds.
  - Published at **[NeurIPS ML Safety Workshop]** 2022. *Pytorch, AI Safety Gridworlds*
- **Forecasting (Ongoing) -** Transformers for Grape Cold-Hardiness Forecasting without weather forecasts.
  - Early promising results for Soil temperature Forecasting. Plan to deploy on AgWeathernet. *Transformers*
- **Offline RL -** Studied effect of different farmer strategies across different farms (without access to a simulator).
  - Trained a Multi-Dynamics World Model and showed that it incurs negative interference under limited data, undermining generalization. *World Models, Crop Simulators, Model-based Off-Policy Evaluation*
- **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 - Reduced number of iterations from 20 (2 years) to 1 (2 weeks) to obtain a material composition which meets design criteria with just 30 samples. *Pytorch, Gaussian Processes*
- **Edge Deployment** of Deep Learning Models - Successfully deployed 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 in a shop with 1000 daily visits. *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 shop with 1000 daily visits. *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]**. *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

- Learning based approach for **Visual Servoing -** Published at **[ICRA 2017]**. *Caffe, OpenRAVE, MATLAB, Drones*
- 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++*

COURSE PROJECTS

- Avoiding Side Effects in Conway's Game of Life Environments via Multi-Task Learning **[Slides]**
- Distributed DQN Q-Learning with Ray Framework via CPU parallelism for data collection and updates **[Code]**
- Offline-RL for Bipedal Robots via Behavior Cloning and Actor-Critic Learning **[Report]**
- Studying Robustness of Semi-supervised Visual Features to Adversarial Attacks **[Report]**
- Monte Carlo Dropout for Efficient RL Exploration in Continuous Maze Environments **[Report]**

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