Sahand Rezaei-Shoshtari
PhD Candidate

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Montreal, Canada

Education

Present – Sep. 2020 | PhD, School of Computer Science, McGill University, Montreal, Canada
Supervisors : David Meger, Doina Precup

Dec. 2019 – Sep. 2017 | Master of Engineering - Thesis, McGill University, Montreal, Canada
Supervisors : Inna Sharf, David Meger
CGPA : 4.00/4.00
Thesis : Learning Manipulator Dynamics for Control and Interaction Inference

Sep. 2016 – Sep. 2012 | Bachelor of Mechanical Engineering, University of Tehran, Tehran, Iran
Supervisor : Masoud Shariat Panahi
CGPA : 3.98/4.00
Thesis : Online Path Planning for a Mobile Robot in Dynamic Environments using Reinforcement Learning

Work Experience

Sep. 2020 – Mar. 2020 | Research Intern, Samsung AI Centre, Montreal, Canada
- Multimodal generative models for visuotactile perception
- Deep reinforcement learning for 5G networks

Mar. 2020 – Jan. 2020 | AI Programmer, Ubisoft La Forge, Montreal, Canada
- Deep reinforcement learning for automated video game testing

Aug. 2019 – Mar. 2019 | Research Intern, Samsung AI Centre, Montreal, Canada
- Object detection neural networks for human hand-wave motions
- Implemented the vision stack on-board of a mobile robot using Google Edge TPU

Apr. 2019 – Sep. 2017 | Teaching Assistant, McGill University, Montreal, Canada
- **Courses :** System Dynamics and Control, Numerical Methods, Machine Element Design

Publications

2021 **Sahand Rezaei-Shoshtari**, Francois R. Hogan, Michael Jenkin, David Meger, and Gregory Dudek. "Learning Intuitive Physics with Multimodal Generative Models". In *Thirty-Fifth AAAI Conference on Artificial Intelligence*. AAAI, 2021.

2021 Francois R. Hogan, Michael Jenkin, **Sahand Rezaei-Shoshtari**, Yogesh Girdhar , David Meger, and Gregory Dudek. "Seeing Through your Skin : Recognizing Objects with a Novel Visuotactile Sensor". In *The IEEE Winter Conference on Applications of Computer Vision (WACV)*. CVF/IEEE, 2021.

2020 Maryam Molamohammadi, **Sahand Rezaei-Shoshtari**, and Nathaniel Quitoriano. "Jacobian of Conditional Generative Models for Sensitivity Analysis of Photovoltaic Device Processes". In *Machine Learning for Engineering Workshop at Neural Information Processing Systems Conference (NeurIPS)*. 2020.

2020 **Sahand Rezaei-Shoshtari**, David Meger, and Inna Sharf. "Learning the Latent Space of Robot Dynamics for Cutting Interaction Inference". In *2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. IEEE, 2020.

2019 **Sahand Rezaei-Shoshtari**, David Meger, and Inna Sharf. "Cascaded Gaussian Processes for Data-efficient Robot Dynamics Learning". In *2019 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. IEEE, 2019.

Certifications

Aug. 2019 **Deep Learning and Reinforcement Learning Summer School** in Edmonton, Canada

Skills

Programming	**Python**, **C++**, **C#**, **MATLAB**, Simulink
Machine Learning Frameworks	**PyTorch**, **TensorFlow**, **GPyTorch**, Jax, GPFlow
Platforms	**ROS**, **Docker**
Robotic Software	**Gazebo**, **Bullet**, **MoveIt!**, **RViz**, **OpenCV**
Other Software	**Unity 3D**, **SolidWorks**, LaTeX, **Microsoft Project**

Select Projects

Gym Forest Fire — 2020

github.com/sahandrez/gym_forestfire

- Fully vectorized forest fire simulation based cellular automaton.
- With OpenAI Gym interface and an implementation of TD3 with CNN actor and critic.

RLBase : Implementations of RL Algorithms — 2020

github.com/sahandrez/rlbase Blog Post

- Minimalistic Deep RL implementations as an educational resource.
- Fork of OpenAI Spinning Up with additional algorithms.

Learning Quadrotor Controls Using Data-Efficient Model-based Reinforcement Learning — 2017

github.com/sahandrez/quad_pilco Simulation Videos

- Implemented PILCO (Probabilistic Inference for Learning Control) on a quadrotor to learn the control policies under the loss of an actuator
- Successfully learned to hover with only three actuators

Motion Planning and Control Utilities for Kinova Jaco 2 Robot — 2017-2018

github.com/sahandrez/jaco_control

- Worked on the full stack of Kinova Jaco 2 robot
- Implemented impedance control, feedforward torque control, and velocity control utilities
- Implemented motion planning utilities for joint space and Cartesian space planning

Honors and Awards

Nov. 2019 IROS Student and Developing Countries (SDC) Travel Award ($600), IEEE/RSJ IROS 2019
2017-2018 Grad Excellence Award ($5000) in Mechanical Engineering, McGill University
2012-2012 Nationwide University Entrance Exam, Ranked **19th**, Iran

Extracurricular Activities

Sep. 2019 **Volunteer, 2019 Montreal AI Symposium** in Montreal, Canada
May 2019 **Volunteer, 2019 IEEE International Conference on Robotics and Automation (ICRA)** in Montreal, Canada