Parsa Samadnejad

Seyed Khandan, Tehran, Iran
(+98)935-370-9900 99psam@gmail.com psam.xyz github.com/troddenspade

Education

K. N. Toosi University of Technology **Sep. 2018 – Feb. 2023**
Bachelor of Science in Computer Engineering *Tehran, Iran*

- CGPA: 19.37/20.00
- Ranked **1st** in a class of 76 students, recipient of Dean's List Reward for Sophomore and Junior Years.
- Thesis: *Optimizing Federated Learning with Deep Reinforcement Learning*

Research Interest

- (Deep) Reinforcement Learning
- Deep Learning
- Meta (Reinforcement) Learning
- Robotics
- Imitation Learning/Inverse RL
- Federated Learning

Research Experience

Advanced Robotics and Automated System (ARAS) Research Lab **Sep. 2022 – Present**
Researcher under the Supervision of Professor Hamid D. Taghirad *Tehran, Iran*

- Designed an automated system to convert portrait images to robot code of hatching style sketches and worked on Deep Reinforcement Learning Approaches to generate a single-line art style for Kamal-ol-Molk painting robot in Parallel & Cable Robotics group.

K. N. Toosi University of Technology **Jan. 2022 – Present**
Undergraduate Researcher under the Supervision of Prof. Farnaz Sheikhi *Tehran, Iran*

- Created a deep neural network architecture to generate artistic images with fast domain translation between real landscape images and various painting styles using Generative Adversarial networks (GAN) and Adaptive Instance Normalization (AdaIN).

K. N. Toosi University of Technology **Aug. 2021 – Present**
Undergraduate Researcher under the Supervision of Prof. Seyed Hossein Khasteh *Tehran, Iran*

- Optimized Federated Learning settings using Deep Reinforcement Learning to select the best parameters–such as client selection, epochs, and batch sizes–and Meta Reinforcement Learning to speed up the adaptation to various data distributions.

Research

Samadnejad P., Khasteh S. H.
"Enhancement and Fast Adaptation of Federated Learning Settings using Reinforcement Learning and Model-Agnostic Meta-Learning"
In prep. - writing (2022)

Samadnejad P., Nouri S., Tajik Gh., Sheikhi F. (list is provisional)
"Unpaired Generalized Style Transfer using the Combination of Reconstruction Modules and Generative Adversarial Networks"
In prep. - revising (2022)

Selected Projects (Codes are available on GitHub.)

Deep RL for Control Tasks with Arduino | *PyTorch, DeepMind Control, Arduino* **Dec. 2022**

- Trained agents on DeepMind's control tasks using SAC and PPO algorithms.
- Deployed the trained models to an Arduino Mega for controlling the simulator's DOFs.

Maximum Entropy Deep Inverse RL | *PyTorch* **Sep. 2022**

- Implemented Maximum Entropy and Deep MaxEnt to obtain nonlinear and linear reward functions.
- Created GridWorld and ObjectWorld environments for evaluation.

Offline Reinforcement Learning Approaches | *PyTorch, D4RL, Hugging Face* **Aug. 2022**

- Implemented Decision Transformer, Conservative Q-Learning, and Behavior cloning algorithms for offline settings.
- Trained models using limited prerecorded datasets consisting of trajectory rollouts of MuJoCo Environments.

Drone Exploration in Maze using Curiosity-driven approaches | *PyTorch, Unreal Game Engine, Airsim* **June 2022**

- Built a Maze environment for navigating a drone using Unreal Engine's assets and Airsim plugin.
- Modified CartPole, Montezuma Revenge, and VizDoom environments for no-reward settings.
- Implemented A2C and PPO algorithms alongside ICM and RND modules to increase exploration using curiosity.

Model-Agnostic Meta-Learning for RL Environments | *PyTorch, Learn2learn* **Apr. 2022**

- Implemented MAML using A2C, TRPO, and PPO meta-learners.
- Trained a model's parameters on HalfCheetah and Ant environments using MAML and optimized the model with few gradient steps to achieve desirable results.

Flexible Conditional Imitation Learning for Autonomous Car | *TensorFlow, Carla, Airsim* **Mar. 2022**

- Implemented Behavioral Cloning method on Airsim car in a mountainous environment.
- Strengthened the training data with Data Aggregation (DAgger) approach.
- Added a set of waypoints as input for Conditional Imitation Learning approach and tested the model with predefined routes as conditions on Unreal's Neighborhood and Carla's Towns environments.

Generative Adversarial Network and Style Transfer Networks | *TensorFlow* **Feb. 2022**

- Implemented various GAN models and image and style translators, including Conditional GAN, Pix2pix, CycleGAN, BicycleGAN, MUNIT, NST, and AdaIN.

Enhance Learning with Parallel Federated RL | *PyTorch* **Oct. 2021**

- Created a Federated Learning framework for RL environments such as CartPole, LunarLander, and SuperMario.
- Trained multiple agents synchronously and aggregated the trained models to achieve a more robust global model compared to a single agent.

Transfering Gestures from Webcam to a Face Model | *OpenCV, Numpy* **Sep. 2021**

- Detected salient points of a face from webcam frame by frame.
- Converted the face's gestures to a model made up of points.
- Reconstructed an animated face using a triangular mapping from another facial image that imitates the first one.

Soccer Players Tracking | *Keras, OpenCV* **Mar. 2021**

- Reconstructed a soccer game's details from the position of players and referees to their movements using three recorded videos with different field coverage.
- Built a neural network classifier to detect the players' team and distinguish them from the referees.
- Movements and positions of the individuals are displayed in a top-view demonstration of a 2D soccer pitch.

Exhaustive Reinforcement Learning | *OpenAI Gym, TensorFlow, PyTorch* **Oct. 2020 - Present**

- Implementation of the prominent RL and DRL algorithms on OpenAI gym and other well-known environments for evaluation and comparison.
- Including: NFQ, DDQN, VPG, A2C/A3C, DDPG, TD3, SAC, TRPO, PPO.

Teaching Experience

K. N. Toosi University of Technology **Sep. 2022 – Feb. 2023**
Teaching Assistant Linear Algebra | *Instructor: Prof. B. Nasihatkon* *Tehran, Iran*

- Grader and designer of weekly practical and theoretical assignments in a class of 46 students.

K. N. Toosi University of Technology **Feb. 2021 – June 2021**
Head Teaching Assistant Discrete Mathematics | *Instructor: Prof. S. H. Khasteh* *Tehran, Iran*

- Led a group of 6 TAs and managed tasks and schedules of a class of +80 students.
- Designed and graded weekly assignments, monthly quizzes, and final exams.

K. N. Toosi University of Technology **Sep. 2020 – June 2021**
Head Teaching Assistant Theory of Languages and Automata *Tehran, Iran*
Instructors: Prof. B. Nasersharif and Prof. S. H. Khasteh

- Led a group of 3 TAs and designed weekly assignments and monthly quizzes for 65 and 45 students in two semesters.

K. N. Toosi University of Technology **Sep. 2019 – Feb. 2020**
Teaching Assistant Fundamental of Programming | *Instructor: Prof. B. Nasihatkon* *Tehran, Iran*

- Designed and graded assignments and projects of a class of 90 students.

Shahid Beheshti High school **June 2018 – Sep. 2018**
Number Theory & Algebra *Sanandaj, Iran*

- Taught Mathematical Olympiad concepts to high school students.

Technical Skills

Languages: Python, C/C++, Arduino, HTML/CSS, JavaScript
ML Libraries/Frameworks: PyTorch, TensorFlow, scikit-learn, Numpy, Pandas
Game Engines: Unity
Web Libraries/Frameworks: React.js, Vuejs, Gatsby
Databases: MySQL, MongoDB

English Tests

GRE Quantitative: 168/170, Verbal:146/170
TOEFL Overall: 107 (Reading: 29, Listening: 27, Speaking: 24, Writing: 27) **Sep. 2022**

Leadership / Extracurricular

BauCTF Competition (website) **Fall 2019 – Summer 2021**
Leader & Full-stack Developer

- Launched an entertaining and challenging Capture The Flag (CTF) competition in the pandemic.
- Developed the CTF from inner-university warm-up challenges to National and International competition, which gained a remarkable score on CTFTime.
- Supervised a group of 12 skillful students with various roles such as web developer, challenge creator, and content designer.
- Designed CTF challenges and developed the front and back sides of the competition's website.