

## RESEARCH INTERESTS

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- **Sequential Decision Making**
- **Reinforcement Learning**
- **Foundation Models**

## EDUCATION

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### **Boston University**

Doctor of Philosophy - PhD

- Major: Computer Engineering

Boston, MA, USA

2023–current

### **Sharif University of Technology**

Bachelor of Science - BSc

- Major: Applied Mathematics
- Minor: Computer Science

Tehran, Iran

2018–2023

## RESEARCH EXPERIENCE




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### **Reward Design of user-in-the-box model for Trackpad Application**

Research Internship at Aalto University

Espoo, Finland

August 2023


- Advisor: Prof. Antti Oulasvirta
- The ultimate goal of this project is to define rich behavioral data for training from an artificial agent with a human biomechanical model. We used a simulated skeleton named user-in-the-box, which is a Mujoco-based biomechanical model. We designed and added the scene for the trackpad application in the simulator, and designed the reward function to train the agent. You can check out the video (link is provided below) to see the trackpad scene and
- Link to user-in-the-box GitHub repo 
- Link to Trackpad Application video demos 
- Link to Trackpad Application presentaion slides 

### **Hierarchical Potential-based Reward Shaping from Task Specifications**

Research Internship at Vienna University of Technology (TU Wien)

Vienna, Austria

Summer 2022

- Advisor: Dr. Radu Grosu
- Defining an effective, compatible reward function can be the trickiest step in solving a large family of control tasks. *HPRS* is a hierarchical, potential-based reward-shaping approach that tries to automate the reward definition by formalizing the task as a set of safety, target, and comfort requirements. In order to diversify the application and further prove the practical usability of HPRS, I implemented this method for Highway-Env, an RL environment for decision-making in autonomous driving.
- Link to HPRS paper preprint 



- Link to HPRS GitHub repo 
- Link to Highway-Env GitHub repo 

## A Reinforcement Learning Approach to Lightning Network Fee Policy

Tehran, Iran

Bachelor Thesis at Sharif University of Technology [Under review]

Fall 2021–Fall 2022


- Supervisor: Dr. Mojtaba Tefagh
- Payment Channel Networks are decentralized transaction mechanisms among a large number of users. Every two users can conduct a transaction with each other if there is a path of sufficiently charged payment channels between them. Each channel on this path can charge a fee to route the transaction and owners of the channels desire to maximize their profit by choosing the best fee for their channels. Currently, the Bitcoin Lightning Network is the most popular, widely-used payment channel network.  
We proposed a dynamic fee-setting environment that can suggest a profitable fee policy for payment channel owners. With the help of the Lightning Network simulator, LEViN, real-world snapshots of the Lightning Network can be fed into this environment. We hope that this work facilitates the use of RL in novel crypto-economic applications.
- Link to [paper preprint](#) 
- Link to GitHub repo 

## Towards Improving the Student-Teacher Framework

Tehran, Iran

Remote Internship at University of New South Wales, Sydney, Australia (UNSW)

Spring 2022 –Winter 2022

- Supervisor: Dr. Francisco Cruz
- Link to project proposal 
- A Student-Teacher framework is a multi-agent reinforcement learning setup in which an agent (or multiple agents) is getting advice on its actions from a teacher (or multiple teachers). The teacher can be a human, an oracle, a pre-trained agent, or another training agent. In most cases, there is a possibility of the teacher making mistakes and giving bad advice. Hence, it is useful to enable the student with a mechanism for advice rejection, so it can prioritize its own actions over the teacher's unreliable advice. I am working on the already existing work done by Cruz et al. named *what makes a good teacher?*, trying to enable agents with a dynamic mechanism for advice rejection.

## AWARDS

- Srinivasa Krishnamurthy PhD Fellowship Fall 2023  
- College of Engineering, Boston University
- Boston University Distinguished Computer Engineering Fellowship Fall 2023  
- Department of Electrical and Computer Engineering, Boston University
- Third place in [!Optimizer](#) Competition of SOAL Optimization Lab  Summer 2021  
- Department of Mathematical Sciences, Sharif University of Technology

## ACADEMIC PROJECTS

### Reinforcement Mechanism Design for Cooperative Multi-Agent System

Fall 2021

Algorithmic Game Theory Course Project

- Two-layer Reinforcement Learning model for learning the optimal communication mechanism in a cooperative and competitive multi-agent system.

### Spleen Medical Segmentation

Spring & Summer 2021

Data Science Internship

- Developed a NN for 3D and 2D Segmentation in PyTorch using [Monai](#) Toolkit

- Dataset : 3D CT-Scan images from [Medical Decathlon](#) - Spleen Task

## Alien Invaders Game

Spring & Summer 2019

Advanced Programming Course Project

- My Version of [Chicken Invaders](#) Game Implemented in Java
- The project had 4 stages: Design, Graphics (Swing), Network (Socket Programming), Database (mySQL)

## Wild Life Simulator

Spring 2020

Operating System Course Project

- Multi Processing  and Multi Threading  in Java

## RELEVANT COURSES

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| • Machine Learning Theory (Graduate Course) | • Algorithmic Game Theory (Graduate Course) |
| • Advanced Linear Algebra (Graduate Course) | • Advanced Programming                      |
| • Convex Optimization                       | • Stochastic Processes                      |
| • Semidefinite Programming                  | • Automata Theory                           |
| • Linear Programming                        | • Computer Organization and Design          |

## SKILLS

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| <b>• Programming:</b> <ol style="list-style-type: none"> <li>1. Julia (Advanced)</li> <li>2. Python (Advanced)</li> <li>3. Java (Advanced)</li> <li>4. C++ (Intermediate)</li> <li>5. Matlab (Intermediate)</li> </ol> | <b>• Optimization:</b> <ol style="list-style-type: none"> <li>1. JuMP (Advanced)</li> <li>2. MathOptInterface (Basic)</li> </ol> <b>• ML:</b> <ol style="list-style-type: none"> <li>1. PyTorch (Intermediate)</li> <li>2. TensorFlow (Intermediate)</li> <li>3. Keras (Intermediate)</li> </ol> | <b>• Web:</b> <ol style="list-style-type: none"> <li>1. HTML/CSS (Basic)</li> </ol> <b>• Tools:</b> <ol style="list-style-type: none"> <li>1. LaTeX (Advanced)</li> </ol> <b>• Techs:</b> <ol style="list-style-type: none"> <li>1. Git (Intermediate)</li> </ol> |
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## LANGUAGES

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- **English:** Proficient (TOEFL iBT: 107/120)
- **Persian:** Native

## REFERENCES

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References are available upon request.