Setareh Cohan

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Education

2020 - Present **Ph.D. in Computer Science** — University of British Columbia
Expected graduation: December 2024
Machine Learning and Reinforcement Learning
Supervisor: Michiel van de Panne

2017 - 2019 **M.Sc. in Computer Science** — University of British Columbia
Supervisors: James Little and Leonid Sigal
Thesis: "Team LSTM: Player Trajectory Prediction in Basketball Games using Graph-based LSTM Networks".

2012 - 2017 **B.Sc. in Computer Engineering** — Sharif University of Technology
Supervisor: Seyed Abolfazl Motahari
Final Project: "Finding Communities in Complex Genetic Networks "
GPA: 17.86/20.

2008 - 2012 **Diploma in Mathematics and Physics Discipline** — Farzanegan High School
GPA: 19.84/20.

Publications

- **Setareh Cohan**, Nam Hee Kim, David Rolnick, Michiel van de Panne. 'Understanding the Evolution of Linear Regions in Deep Reinforcement Learning." *NeurIPS*, 2022 [Arxiv] [Project Page] [Code]

Project Highlights

Diffusion Models for Motion Synthesis
Ongoing project in which we explore the capabilities of probabilistic diffusion models for human motion synthesis and editing.

Team LSTM: Player Trajectory Prediction in Basketball Games using Graph-based LSTM Networks
We predict the future positions of players based on their past positions. Similar to a previous work called the Social LSTM model, we treat trajectory prediction as a sequence prediction task and exploit LSTM networks to solve the problem. To better capture player interactions and structure of the game, we propose a new graph-based pooling structure for the LSTM networks. The new pooling mechanism is based on Relation Networks and it improves the accuracy of our predictions and our model outperforms Social-LSTM model in this task. [Code]

A Bayesian Approach to Visual Question Answering
Final project of *Probabilistic Programming* course.
Having generative models for VQA tasks such as CLEVR, we perform Bayesian inference to find the latent variables of questions and images independently. We are then left with a much simpler task of answering the question based on low dimensional and interpretable latent variables. Our model achieves state-of-the-art performance while having better generalization abilities. [PDF]

RegNet: Regularizing Deep Networks
Final project of *Multimodal Learning with Vision, Language and Sound* course.
In this work, we design a novel method to regularize deep convolutional neural networks based on class similarities to get better classification accuracy for rare classes; classes with few training samples. The idea behind this work is for the network to learn to borrow the general features of a rare class from relevant classes so that only the distinctive features specific to the rare class need to be learned. To do this, we add a prior to the loss function that encourages weight vectors corresponding to visually similar classes, to be similar. Our experiments show that we achieve some increase in classification accuracy using the hierarchical variation of our method. [PDF] [Code]

Learning to Ride a Bike
Final project of *Computer Animation* course.
We implement a simulator for bicycle motion and used the Fitted Value Iteration algorithm for keeping the bike balanced while it moves at a constant speed. [PDF] [Code]

Experience

2020 May-Aug
Research Intern, Supervisor: Lili Meng — Borealis AI
Investigated the advantages of integrating probabilistic prediction and selective prediction (or prediction with reject option) for regression tasks. Implemented SelectiveNet (Geifman et al., ICML2019), and altered the prediction modules to probabilistic prediction. Designed and executed numerical experiments on large computer clusters for classification and regression tasks. [Code]

2016 July-Sep
Software Developer Intern, Supervisor: Hossein Asadi — Sharif University of Technology (DSN Laboratory)
I joined a team to develop an application for data storage performance testing. I implemented a simulator in C++ that performed certain tasks our target hardware did, with the same input and output. This simulator was later used to test the performance of our data storage systems.

Teaching

Winter 2020
Teaching Assistant, CPSC 440: Advanced Machine Learning
Gave tutorials on diverse topics in machine learning, including density estimation, Monte Carlo methods, graphical models and deep neural networks. Held weekly office hours for students and participated in grading assignments and exams.

Winter 2019
Teaching Assistant, CPSC 340: Machine Learning
Gave tutorials on diverse topics in machine learning, including regularization, kernel trick, MAP estimation and deep neural networks. Designed questions for quizzes and exams, held weekly office hours for students, and participated in grading assignments and exams.

Fall 2019
Summer 2019
Winter 2018
Fall 2017
Teaching Assistant, CPSC 320: Intermediate Algorithm Design and Analysis
Gave tutorials on diverse topics in algorithm design including dynamic programming, reductions and NP-completeness. Designed quizzes, held office hours and participated in grading assignments and exams.

Honors and Awards

2020-Present
Recipient of President's Academic Excellence Initiative PhD Award

2017-2019
Recipient of International Tuition Award from the University of British Columbia

2017
Ranked **1st** in cumulative GPA among students majoring in Information Technology Engineering, class of 2017, Sharif University of Technology.

Extracurricular Activities

Fall 2019
Student Volunteer, 32nd Conference on Neural Information Processing Systems (NeurIPS)
Vancouver, Canada

Summer 2019
Participant of CIFAR Deep Learning and Reinforcement Learning Summer School (DLRLSS)
Edmonton, Canada

Fall 2014
Participant of ACM-ICPC Regional Contest
Tehran, Iran

Skills

Programming Languages: Python (preferred), C/C++, Java, Matlab, Julia, HTML, MySQL

Frameworks: Pytorch, Torch, Tensorflow, Pyprob