

# Alireza Moazeni

COMPUTER SCIENCE

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## Education

**Simon Fraser University (SFU)**

British Columbia, Canada

COMPUTER SCIENCE

Sep. 2021 - Current

**Ph.D.**

A Ph.D. student in Computer Science at Simon Fraser University.

**Amirkabir University of Technology (AUT)**

Tehran, Iran

BACHELOR OF SCIENCE

Sep. 2015 - Sep. 2020

**Computer Engineering**

- GPA
  - Total: **18.40 out of 20**
  - Cumulative GPA (**3.84/4.00**)
- Selected courses (**The complete list is available on my website.**)
  - Online
    - ★ Deep Learning A-Z™: Hands-On Artificial Neural Networks, Udemy
    - ★ Deep Learning Advanced Computer Vision, Udemy
    - ★ Machine learning, Prof. Andrew NG, Stanford University, Coursera
    - ★ Neuroplasticity 2.0 Modern Neuroscience To Rewire Your Brain, Udemy
    - ★ Reinforcement Learning Specialization, Master the Concepts of Reinforcement Learning Offered by University of Alberta

**Electrical Engineering**

I chose Electrical Engineering (The Department of Control) as my **minor focus** because of my interest in **Robotics, Electronics**, and **Control Concepts**.

**National Organization for Development of Exceptional Talents (NODET)**

Tehran, Iran

DIPLOMA IN MATHEMATICS AND PHYSICS DISCIPLINE

Sep. 2011 - Sep. 2015

- GPA: 19.65/20

## Research Interests

- Computer Vision
- Deep Learning
- Machine Learning
- Reinforcement Learning
- Artificial Intelligence

## Publications

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### CHIMLE: Conditional Hierarchical IMLE

Canada

AUTHORS: SHICHONG PENG, **ALIREZA MOAZENI**, KE LI, NEURIPS 2022

Nov. 2022

#### Abstract

A persistent challenge in conditional image synthesis has been generating diverse output images from the same input image due to the problem of mode collapse. Implicit Maximum Likelihood Estimation (IMLE) is a recently proposed alternative that aims to address this issue. IMLE uses the same generator as GANs but adopts a different objective function which ensures each observed image has a generated sample nearby. To generate high-fidelity images, prior IMLE-based methods require a large number of samples. Doing so is expensive, and so this limits image fidelity in practice. In this paper, we propose a new method to get around this limitation, which we dub Conditional Hierarchical IMLE (CHIMLE), which can generate high-fidelity images without requiring many samples. We show on multiple tasks that CHIMLE significantly improves generated image fidelity, as demonstrated by a reduction in Fréchet Inception Distance (FID) by 36.9% on average compared to the prior best IMLE-based method.

## Experiences

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### i-Click (Maya Stitch)

Tehran, Iran

A.I. DEVELOPER AND PRODUCT MANAGEMENT

May. 2016 - May. 2020

i-Click Company is one of the top companies in the embroidery and sequins industry that produces professional embroidery software. My main activity in this company started with launching an intelligent system in the field of embroidery. Maya i-Box is an innovative and revolutionary software that uses the latest programming technologies involving artificial intelligence; it allows a new user who never digitized an embroidery design to create a well-optimized and ready-to-use DST design file. Some of this program's primary functions include a **photo to embroidery**, **photo to sequin**, **photo to cross stitches**, and **digitize the design created with a smart pencil on a touch screen**. We have used **image processing** techniques such as **automatic color reduction** (embroidery machines only support 2-14 colors), **noise reduction**, **edge detection**, **objects**, and **shapes detection**. Due to the work's vector nature, we used high-level **computational geometry** techniques, **graph algorithms**, and **mathematics**. Some of the notable challenges we dealt with included converting **image pixels to vectors and polygons**, using **skeletal detection algorithms**, **divide complex polygons into simpler polygons** to fill them with stitching, and **optimally connecting the separated results** with the help of the **traveler salesman problem**. **Security** and the **application's protection** was a significant challenge that we solved by using **physical locks** to protect the app and some **code transfers**. The product is **Qt(C++)-based** and runs on **NanoPC boards**.

### Teaching Assistant

Vancouver, Canada

SIMON FRASER UNIVERSITY

Winter 2022

- Machine Learning
  - Instructor: Dr. Ke Li, Winter 2022

### Teaching Assistant

Tehran, Iran

AMIRKABIR UNIVERSITY OF TECHNOLOGY

Spring 2019 - Fall 2019

- Laboratory Instructor of Basic Programming
  - Fall 2020
- Internet of Things
  - Instructor: Dr. Rasti, Summer 2020
- Computational Intelligence
  - Instructor: Dr. Ebadzadeh, Fall 2019
- Computer Networks
  - Instructor: Dr. Sabaei, Fall 2019
- Data Structure and Algorithms Design
  - Instructor: Dr. Bagheri, Spring 2019

- **Neural Style Transfer Web Application (Bachelor Project)**

- My B.S project's research is "Design and Implementation of Neural Style Transfer Web Application". The project's core is Transfer Learning and Optimization. This application gets two images from the user (content and style images) and outputs a painted image resulting from applying artwork style to the content image. My goals were improving the output's quality of the Neural Style Transfer Algorithm presented in the original paper through Hyper-Parameter optimization. The whole procedure includes comparing the output quality of two different CNN architectures (VGG16 and VGG19), comparing reconstruction of the style and content from different blocks of the network, overcoming the problem of emerging high-frequency artifacts during the optimization section, comparing the effect of having a fixed or dynamic ration for the content to style weights during optimization, analyzing the effect of two different optimization algorithms (Adam and L-BFGS) and creation of output from the different start point in the optimization step.
- Supervisor: Dr. Nazerfard

- **Video Objects Detection Using SSD Algorithm**

- I designed and implemented a system that uses CNN to detect objects in a photo or video in real-time using the SSD (Single-Shot MultiBox Detector) algorithm. I will address challenges such as detecting multiple objects in an image optimally, the coverage of some objects by other objects, the optimal implementation of a sliding window, the different aspect ratio of objects, and the presence of objects in different scales.
- Supervisor: Dr. Nazerfard, Spring 2020

- **Persian Newsreader and Search Engine**

- I implemented a newsreader and search engine as a web application in python. The overall process contains crawling and extracing persian news,pre-processing steps like stemming, lemmatization, clustering, and classification of news, and finally, creating a fast inverted index would be generated to handle the user's query.
- Supervisor: Dr. Nikabadi, Fall 2019

- **Training RBF Network by Evolutionary Strategy**

- I implemented and trained a neural network with the goal of regression, binary classification, and multi-class classification in Python. The network has a hidden layer with a variant number of perceptrons in which has a radial basis function as an activation function; the goal is to find the best number of bases, their radius, and weights in the network with the cooperation of evolutionary strategy.
- Supervisor: Dr. Ebadzadeh, Spring 2019

- **Label Propagation Algorithm based on Local Cycles for Community Detection**

- The LPA algorithm has been proven to be an extremely fast method for community detection in large complex networks. An important issue of the LPA algorithm has not yet been appropriately addressed that random update orders in label propagation process hamper the algorithm robustness; In order to rectify this problem, I implemented the LPA based on the local cycles.
- Supervisor: Dr. Bagheri, Spring 2018

## Honors & Awards

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2020	<b>Offered for Direct Admission to graduate school (Ph.D.) in Computer Science</b> , Simon Fraser University, Vancouver, Canada	<i>Vancouver, Canada</i>
2020	<b>Offered for Direct Admission to graduate school (Master of Science) in Computer Engineering - Artificial Intelligence, without taking the Nationwide University Entrance Exam for M.Sc. as a reward of academic records and achievements.</b> , Amirkabir University of Technology, Tehran, Iran	<i>Tehran, Iran</i>
2020	<b>Ranked in the top 5% among 100 undergraduate students in Computer Engineering and IT Department</b> , Amirkabir University of Technology, Tehran, Iran	<i>Tehran, Iran</i>
2017	<b>Ranked 4th among about 35 undergraduate students in Electrical Engineering Department (Control Engineering Major)</b> , Amirkabir University of Technology, Tehran, Iran (over 92 credits)	<i>Tehran, Iran</i>
2017	<b>IT Manager of Electrical Engineering Association Department</b> , Amirkabir University of Technology, Tehran, Iran	<i>Tehran, Iran</i>
2015	<b>Admitted to AUT</b> , Achieved <b>top 0.15 %</b> place among all applicants of the Nationwide University Entrance Exam for B.Sc. in Math. and Engineering (Approximately <b>250000 applicants</b> )	<i>Tehran, Iran</i>
2013	<b>2nd place in League Junior Soccer 'B' Light Weight</b> , RoboCup IranOpen 2013 Competitions	<i>Tehran, Iran</i>
2013	<b>1st place in League Junior Soccer 'B' Light Weight</b> , RoboCup Hellicup(related to NODET) 2013 Competitions	<i>Tehran, Iran</i>
2011	<b>Admission to NODET</b> , National Organization for Development of Exceptional Talents	<i>Tehran, Iran</i>
2010	<b>1st place in the National Conference on mathematics, analytic geometry and spatial orientation from Ministry of Science 2010</b> ,	<i>Tehran, Iran</i>

## Skills

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<b>Programming Languages</b>	C++(Qt), Python, Java, C, Assembly Micro 8086 Matlab, Google Flutter
<b>Web</b>	PHP(Laravel Framework), Javascript, Django, HTML5 & XHTML, CSS3, PostgreSQL, jQuery, VueJs, Bootstrap
<b>Frameworks and Toolkits</b>	PyTorch, Keras, Tensorflow, OpenCV, Modelsim, Arduino, Git
<b>Technologies</b>	Blockchain and Cryptocurrency
<b>Operating Systems</b>	Windows, Linux (Ubuntu, Kali, Armbian, FriendlyARM)
<b>Typesetting</b>	Latex, Microsoft Office
<b>Sports</b>	Swimming, Hiking, Biking, Badminton
<b>Hobbies</b>	Watching Movies, Financial Book Reading, Mountain Climbing