Ali Gholami

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EDUCATION

B.S. Computer Engineering @ Amirkabir University of Technology
[1'st Industrial University in Iran] GPA: 3.6/4

Mathematics & Physics Diploma @ Kamal Highschool GPA: 19/20

RESEARCH INTERESTS

- Visual Question Answering
- Image Captioning
- Image Segmentation
- High Performance Computing
- Heterogeneous Programming
- Applied Deep Learning

RELATED COURSES

Machine Learning @ Amirkabir University of Technology
Computer Vision @ Udacity
Deep Learning @ Udacity
cs231n @ Stanford University
OpenMP @ Intel

RESEARCH EXPERIENCE

Machine Learning Lab @ Amirkabir University of Technology — July 2018 – Present
Computer Vision — Pattern Recognition

- Generative Adversarial Models for Style Transfer in Images
- Analysis of Formal Representation of Deep Learning Models
- One-shot Imitation Learning

CEIT @ Amirkabir University of Technology — Dec 2017 – Present
Computer Vision — Pattern Recognition

- Implementation of *AlexNet CNN* architecture using *Tensorflow* [code]
- Implementation of a *DCGAN* to draw *MNIST* using *Tensorflow* [code]
- Implementation of a *Variational Autoencoder* using *Tensorflow* [code]
- Implementation of various *Deep Learning* techniques using *Tensorflow* [code]

TECHNICAL REPORTS

Statistical Pattern Recognition
Advisor: Prof. Mohammad Rahmati

- *Introduction to Linear Algebra – Statistics – Probabilities* [docs]
- *Bayesian Decision Boundaries – Bayes Error Bounds – Risk Minimization* [docs]
- *Maximum Likelihood & Bayesian Parameter Estimation* [docs]
- *Kernel Density Estimation – KNN Density Estimation* [docs]
- *PCA – FLDA – Feature Subset Selection* [docs]
- *LDF – SVM – Clustering* [docs]

Foundations of Data Mining
Advisor: Prof. Ehsan Nazerfard
- *Association Rule Mining – Feature Engineering* [docs]
- *Decision Tree Classifier – Data Cleaning* [docs]
- *Naive Bayes Classifier – Spam Filtering – Text Processing* [docs]
- *Data Preprocessing & Model Building with RapidMiner* [docs]

Design & Implementation of Programming Languages
Advisor: Prof. Mehran S. Fallah
- *Induction & Denotational Semantics – Lambda Calculus* [docs]
- *Lisp & Garbage Collection – Higher-order Functions* [docs]
- *Algol & Meta Language – ML Data Types & Patterns* [docs]
- *Type Safety & Type Inference – Polymorphism* [docs]

Computer Networks
Advisor: Prof. Siavash Khorsandi
- *Introduction to Computer Networks* [docs]
- *Packet Transmission Approaches – Congestion Control* [docs]
- *Queuing & Delay Analysis & Network Protocol Stack 1* [docs]
- *Queuing & Delay Analysis & Network Protocol Stack 2* [docs]
- *Multiplexing & Multiple Access Medium – IETF* [docs]
- *Application Layer Protocols; HTTP – FTP – SMTP – CDN – DNS* [docs]
- *Reliable Data Transfer; Stop & Wait Protocol* [docs]
- *Reliable Data Transfer; Go-Back-N & Selective Retransmit Protocols* [docs]

Multi-core Programming
Advisor: Prof. Mahmoud Momtazpour
- *Parallel Architectures – Speedup Metrics* [docs]
- *OpenMP – Parallelization of Matrix Computations* [docs]
- *OpenMP – Parallelization of Sort Algorithms* [docs]
- *Nvidia GPUs Architecture – Memory Types – GPU Characteristics* [docs]
- *Parallel Scan – Reduction Strategies on CUDA* [docs]
- *Reduction Tuning – Bank Conflicts – Loop Unrolling* [docs]

Engineering Ethics
Advisor: Prof. Ali Dizani
- *A Deep Analysis of Ethical Dilemmas in Computer Engineering.* [docs]

WORK EXPERIENCE

Internship @ Arvan Cloud — Jun – Sep 2017
Web Application Development
- *HTML, CSS, PHP, Laravel, Javascript, ECMAScript, Node.js, Vue.js, React.js*

Internship @ Fandogh — Jun – Aug 2017
Mobile Application Development
- *Java, React Native*

TEACHING EXPERIENCE

T.A. @ CEIT @ Amirkabir University of Technology — Sep – Dec 2017
Microprocessors & Assembly Programming
Advisor: Prof. Mahdi Homayounpour [Resources]

T.A. @ ENG @ Kharazmi University of Tehran — Sep – Dec 2015
Foundations of Programming in C++
Advisor: Dr. Azadeh Mansouri [Resources]

HONORS

Ranked top 3 among most active **GitHub** developers in Iran. June 2018

Admitted to **Amirkabir University of Technology** among all bachelor students at Computer Engineering Department, Kharazmi University of Tehran. Aug 2018

Member of Executive Team at the 17'th International Collegiate Programming Contest held at the Amirkabir University of Technology. Nov 2017

Participated in the 4'th national programming contest contest held at the Sharif University of Technology as a member of *Morph* team. Sep 2017

Ranked top 3 among all bachelor students at Computer Engieering Department, Kharazmi University of Tehran. July 2016

Participated in the Avatech's Educational Startup Weekend held at the University of Tehran, as a member of *3-mim* team. Jun 2015

Ranked top 0.006 in the Nationwide University Entrance Exam among all students in Mathemathics and physics (approximately 250,000). July 2014

Elected as the **tidiest** student at the campus of international summer school, *Institute Monte Rosa*, Montreux, Switzerland. Aug 2011

TALKS

Automatic Image Captioning with Attention Mechanism June 2018

- Based on the paper *Show and tell: A neural image caption generator* by Vinyals, O., Toshev, A., Bengio, S. and Erhan, D.

Visual Question Answering with CNNs and RNNs May 2018

- Based on the paper *Visual question answering: Datasets, algorithms, and future challenges* by K. Kafle and C. Kanan.

Machine Learning at Scale Oct 2017

- Based on the paper *Rules of Machine Learning* by Dr. Martin Zinkevich.

Energy Awareness July 2017

- Based on the paper *Energy-aware adaptation for mobile applications* by Dr. Jason Flinn.

Metasploit Framework May 2017

- Introduction to *Metasploit Framework* & *Social Engineering* techniques.

SKILLS

Languages Persian (*native*), English (*advanced working proficiency*)

Data Science *Python, Scikit-learn, Numpy, Pandas, Matplotlib, RapidMiner, Weka.*

Computer Vision & Deep Learning *Tensorflow, OpenCV.*

Parallel Processing Frameworks *C/C++ @ OpenMP, Intel VTune Amplifier, Intel Inspector, C/C++ @ CUDA, Nsight Monitor.*

Functional Programming *Racket, ML, Scheme.*

Hardware Design *VHDL, Verilog, HLS, AVR, ARM, Arduino, Xillinx Vivado, ModelSim, Atmel Studio, Proteus, Cadence PSpice, Keil.*

Networking *GNS3, Wireshark, Packet Tracer, Boson NetSim.*

Mobile Application Development *Java, React Native, Android Studio.*

Web Application Development *HTML/CSS, Javascript, Node.js, React, PHP, Laravel.*

Databases *PostgreSQL, MySQL, MongoDB.*

NOTABLE PROJECTS

KDEPlot, *Density Estimation*
- Implementation of 1-D and 2-D Kernel Density Estimation Methods in Python using Numpy and Matplotlib Only. [code]

KNNCC, *Image Classification*
- Implementation of a K-Nearest Neighbour *CIFAR-10* Classifier in Python. [code]

Paralab, *Parallel Processing*
- Implementation of frequent parallel problems using OpenMP and Intel Parallel Studio in C. [code]

Annealing, *Data Cleaning & Preprocessing*
- Preprocessing and training the dataset of annealing. Reached 98% accuracy with a decision tree classifier. [docs] [code]

Titanic, *Data Science & Feature Engineering*
- Prediction of Titanic survivals as a part of Kaggle competition. Reached an Accuracy of 83% and Recall of 76%. [code]

MNIST-Drawer, *Variational Autoencoder*
- Implementation of a *Variational Autoencoder* to draw *MNIST* dataset characters using *Tensorflow*. [code]

notMNIST, *Convolutional Neural Network*
- Implementation of multiple machine learning classifiers and regularization techniques on the *notMNIST* dataset using *Tensorflow*. [code]

Freeman, *Hardware Programming & Co-design*
- Implementation of a *Parking Controller* & *Security Controller* using *VHDL*. [code]

Numex, *Functional Programming*
- Implementation of an *Advanced Functional Interpreter* using *Racket*. [code]

Hornburg, *Deep Learning Basics*
- Implementation of *Principal Machine Learning Algorithms* using *Python*. [code]

Iris, *Multi-nomial classification*
- Multi-nomial classification of *Iris* dataset using *scikit-learn*. [code]

ARMHE, *Advanced RISC Machine Programming*
- Implementation of the *Histogram Equalization* algorithm on the *STMF32F407VGT6*

with *ARMv4T* architecture using *ARM Assembly*. [code]

Cinder, *Low Level Programming*
- Implementation of a basic *Operating System* with *C*. [code]

Chronicle, *Compiler Design*
- Implementation of a *lexical analyzer*, *syntax analyzer* and a *partial code generator* using *Lex & Yacc* in *Java*. [code]

Sockets, *Socket Programming*
- Implementation of various types of *Sockets* in *Interprocess Communication* & *TCP/IP Protocol* with *C*. [code]

Toofan, *Android Application Development*
- Implementation of a *Weather Forecast Application* on the *Android* platform using *Java* & *Android Studio*. [code]

Huffman, *Huffman Coding*
- Implementation of the *Huffman Text Compression Algorithm* using *Java*. [code]

2048, *C++ Programming*
- Implementation of the *2048 Puzzle Game* with various gameplay tweaks using *C++*. [code]

Manobase, *VHDL Programming*
- Implementation of the *Morris Mano's Base Computer* using *VHDL*. [code]