# EHSAN GANJIDOOST

Ph.D. CANDIDATE IN COMPUTER SCIENCE · WITH SPECIALTY IN DEEP LEARNING & MACHINE LEARNING

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#### Education \_\_\_\_\_

University of Waterloo, Canada Waterloo, Canada

Sep. 2016 - present

Sep. 2014 - Aug. 2015

Ph.D. IN COMPUTER SCIENCE

• Thesis: Predictive Estimators and Perceptual Feedback Networks

University of Waterloo, Canada Waterloo, Canada

MMATH. IN COMPUTATIONAL MATHEMATICS

• Thesis: On Preconditioning the Linearized Conjugate Gradient method for Sparse Nonlinear Optimization.

Iran University of Science & Technology Tehran, Iran

M.Sc. in Computer Engineering Sep. 2002 - Mar. 2005

• Thesis: Study of Cache Structure and its Impact on the Performance of Network Processors

Shahid Beheshti University

Tehran, Iran

**B.Sc. in Computer Engineering**Sep. 1997 - Mar. 2002

• Thesis: Wireless Client/server System Implementation

#### Academic Activities \_\_\_\_\_

#### **PUBLICATIONS**

2020	Ganjidoost E., "Capturing Variations on Generative Predictive Coding"	pending NeurIPS
2019	Ganjidoost E., "Notes on Neural Networks Part 3: Credit Assignment Problem"	under review
2019	Ganjidoost E., "Notes on Neural Networks Part 2: Biological Adaptive Neural Networks"	under review
2019	Ganjidoost E., "Notes on Neural Networks Part 1: Artificial Neural Networks"	under review
2017	<b>Ganjidoost E.</b> , Orchard J., "Non-linear mapping in a neural network using predictive coding" (research paper)	UofW
2017	<b>Ganjidoost E.</b> , Orchard J., "Predictive coding framed with neuron engineering framework" (research paper)	UofW
2005	Ganjidoost E., Akbari A., "Impact of cache structure on network processor performance" (oral)	CESC
2004	Ganjidoost E., Gharegouzi A., Akbari A., "Improvement speech quality by noise detection and elimination using	IUST
	averaged algorithm" (research paper)	
2003	Ganjidoost E., Fathy M., "Computer Architecture, A Quantitative Aproach - Memory Hierarchy Design"	IUST
	(translation)	

#### **PRESENTATION**

Fall 2020	<b>"Kaggle challenge design"</b> , @ Intro to Machine Learning Project	Waterloo, ON
Fall 2020	"Transformers", @ Neurocomgnitive Computing Lab	Waterloo, ON
Spr. 2020	"Walk through BiDAF model", @ Neurocomgnitive Computing Lab	Waterloo, ON
Win 2020	"Pandas' Essential Tutorial", @ Neurocomgnitive Computing Lab	Waterloo, ON
Win. 202	"On Predictive Coding", @ Neurocomgnitive Computing Lab	Waterloo, ON
Spr. 2019	"Generative Neural Networks", @ The 12th Annual Ottawa Mathematics Conference (OMC)	Waterloo, ON
A 2001	"Impact of Cache Structure on Network Processor Performance", @ The 7th Computer Engineering Student	Tehran, Iran
Apr. 2005	Conference (CESC)	
Apr. 2004	"Ad-hoc Network Architecture", @ IUST, Grad Seminar Series	Tehran, Iran
Apr. 2003	"Rollback Recovery Policy in Operating System", @ IUST, Grad Seminar Series	Tehran, Iran
Dec. 2003	3 "Computer Networks Performance Modeling", @ IUST, Grad Seminar Series	Tehran, Iran

# Awards & Recognitions \_\_\_\_\_

2016-20	Institutional, Academic, Recepient of four Doctoral Awards (total \$30.25k)	Waterloo, ON
2014-15	Institutional, Academic, Recepient of two Master of Mathematics Awards (total \$9k)	Waterloo, ON
2007	<b>Provincial, Leadership</b> , Recepient of Tehran City Council Award (Gold prize)	Tehran, Iran
2016-17	<b>National, Academic,</b> Nominated for NSERC research proposal by the University of Waterloo.	Waterloo, ON
2002	National, Academic, Ranked Top 0.1% National Enterance Exam for Grad School	Tehran, Iran
1997	National, Academic, Ranked Top 0.1% National Enterance Exam	Tehran, Iran
1996	<b>National</b> , Nominated for the 2 <sup>nd</sup> round of National Computer & Mathematic Olympiad	Tehran, Iran

# **Certificates (short-listed)**

Al & Machine Learnin Machine Learning, DeepLearning Specialization, Tensorflow, NLP Specialization (planned)

**Computer Science** Algorithm Design I & II, Intro to Databases, mongoDB, Python **Finance** WatRISQ, Corporate Finance, Finance, Financial Accounting

**Teaching** Fundamentals of University Teaching, Certificate in University Teaching

#### Professional Technical Skills

Advanced Programming Python, MATLAB, R, C/C++, Java, JavaScript, Node.js, Processing, Gephi, OWL, HTML, LaTeX, Jekyll,

Most Used Packages Numpy, Scikit-learn, Pandas, PyViz, PyTorch, Tensorflow, Keras, Jax, Matplotlib

**Database** SQL, DTD, XML, XSD, XQuery, XSLT, UML, OLAP, JSON, mongoDB IDE, Editor PyCharm, IPython, Colab, Sublime, Atom, CodeVisionAVR

# **Projects & Models (short-listed)**

Unsupervised Models AE, VAE, GAN, Recommender system, Q&A, Machine Translation → main packages: numpy, tensorflow, keras

Supervised Models CNNs (LeNet, AlexNet, VGGNet, ResNet, Inception) → main packages: nunmpy, tensorflow, keras Sequence Models RNNs (LSTM, GRU), TimeSeries, NLPs (Word2Vec, debiasing, BiDAF, Transformers, BERT)

**Projects** fleet scheduling (Cayuga Research), portfolio optimizer (personal project), Predictive Coding (doctoral research)

### Research Experience \_\_\_\_\_

#### **Neurocognitive Computing Lab**

Waterloo, ON Sep. 2016 - present

May. 2014 - Sep. 2016

May. 2014 - Sep. 2014

Tehran, Iran

DOCTORAL RESEARCHER

- Designed & implemented predictive coding platform for generative model experiments.
- Implemented a neural network platform with spiking neurons using Nengo framework for class prediction experiments.
- Developed a neural network based on a real-time dynamical system for research on the compatible biological model.
- Collaborated with fellow researchers on testing symmetric predictive estimator on the Nengo framework.
- Invited to campus Correlation One Datathon working on Uber data from NYC in a team of four, May 2017.

**University of Waterloo** Waterloo, ON

GRAD RESEARCHER & DEVELOPER • Developed a pre-conditioning method for nonlinear optimization solver.

- Implemented a large-scale continuous optimization solver using the coloring method.

· Developed TSP heuristic using edge elimination techniques to find the shortest path among given data points

Cayuga Research Waterloo, ON

RESEARCHER • Studied and formulized fleet scheduling for Logistic & Transportation Allocation.

**ITRC** 

RESEARCH ASSISTANT Mar. 2004 - Mar. 2005

• Analyzed the cache structure impact on Network Processor performance.

### **Educational Activities**

**OCTOBER 5, 2020** 

**University of Waterloo** Waterloo, Canada TEACHING ASSISTANT Sep. 2016 - present CS 480/680: Introduction to ML CS 486/686: Introduction to AI W19, S19, F19, W20, S20 CS 475/675: Computational Linear Algebra CS 489/689: Neural Networks W18 CS 370: Numerical Computation F17, F18 CS 240: Data Structure & Data Management

**University of Waterloo** Waterloo, Canada

TUTORIAL

Sep. 2014 - May 2015 Math 127: Calculus I for Science W15 Math 115: Linear Algebra for Engineering F14 Math 135: Algebra for Honor Math F14

### **R&D** Experience

Marsuscom co. Tehran, Iran

COMPUTER ENGINEER Nov. 2009 - Sep. 2011

- System & Code Developer.
- Smart Home Control System Developer.

CS 136: Algorithm Design & Data Abstraction CS 135: Designing Functional Programs

**PARMAN** Tehran, Iran

Jun. 2009 - Nov. 2009 TECHNICAL PROGRAMM

• Fiber Optic Network TX/RX STM-1 test and verification engineer.

PARSTEL Telecom co.

Jun. 2007 - Jun. 2009 COMPUTER ENGINEER

- Code Developer for STN-10K Switch.
- Hardware designer and embedded programmer for line card.

**VESAL co. ISP** Tehran, Iran

COMPUTER ENGINEER INTERN Jun. 2000 - Sep. 2000

- · Computer Networking.
- Design, Implement and troubleshooting network.

### Additional Experience \_\_\_\_\_

NAMA co. - startup Tehran, Iran

CO-FOUNDER & VIDEO EDITOR Jun. 2003 - Sep. 2007

Produced and edited videos for documentaries, a charity, and advertisements.

**Imam Hadi Charity.** Tehran, Iran

VOLUNTEER VIDEO EDITOR & VIDEOGRAPHER

Jun. 2003 - Sep. 2003

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• Edited and managed video projects using adobe premiere, after effects, and Hollywood fx for producing teaser and video for the charity.

Soroush High School. Tehran, Iran

Sep. 1997 - Sep. 2003 INSTRUCTOR AND TRAINER

Taught Fundamental of Computer Programming to prodigy high school students and mentored learners in video editing during the summer school.

#### **Hobbies**

Last minute choices listening to music, watching (documentary/adventure) movies. **Learning habbits** Problem solving (algorithm, optimization, puzzle), brain game

**Sport Activities** swimming, hiking and biking, soccer, ping-pong

> To-Do list skating, photography, astronomy, coast-2-coast road trip