Mehrzad Mortazavi

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R&D Interests	Sequence Models, Generative Models, Representation Learning, Continual Learning, Imbalanced and noisy data problems

Education

Master of Computer Science   Sept. 2017 - Present
     Concordia University

Surgical Innovation Fellow   Sept. 2017 - Present
     Experimental Surgery program, McGill University

B.Sc. in Computer Software Engineering   Sept. 2012 – Feb. 2017
     Isfahan University of Technology

Publications

FoCL: Feature-oriented Continual Learning, Qicheng Lao, **Mehrzad Mortazavi,** Ahmad Pesaranghader, Marzieh Tahaei, Francis Dutil, Thomas Fevens, Mohammad Havaei (Under Review)

Industry Experience

Software Tester   Winter 2018 - Present
Nxtsens Microsystems inc., Montreal, Quebec

- Worked on MY01 – a continuous pressure sensor medical device. I defined the unit-testing protocol, implemented unit-testing framework (unity) and tools over CI/CD and Docker for embedded arm-gcc, implemented unit-level test cases with more than 70% of the code, reviewed and refactored the code, developed new functionalities, and performed system-level testing following IEC 62304.

Internship   Summer 2016
ITRI, Hsinchu, Taiwan

- I developed DNNs in multiple for Image Classification problems and proposed an optimization guideline to choose hyper-parameters intuitively for the users of an internal DNN IDE. I used Caffe, Nvidia DIGITS, and DeepVis frameworks on MNIST, CIFAR10, and CIFAR100 datasets.

R&D Experiences

Research Assistant   Fall 2017- Present
Dr. Fevens laboratory, Computer Science department, Concordia University, Montreal, Canada

- I am currently working on Continual Learning (CL) in the application of images for Discriminative and Generative models. I am trying to alleviate notorious problem of *catastrophic forgetting* using a learnable weighted loss function to find the best samples to store for a *replay-based learning* CL solution.

Research Assistant   Fall 2016- Winter 2017
HaDIP laboratory, ECE department, IUT, Isfahan, Iran

- **Detection of tumors in brain MRI using Deep Learning techniques (BSc thesis)**
  I used CNNs to detect brain tumors on the BRATS dataset processed by an image processing pipeline coded in MATLAB and python and reached 93% accuracy.
- **Classification of Indoor-Outdoor images using Deep Learning for depth estimation**
  I enhanced the results of a depth estimation system by categorizing images to Indoor-Outdoor classes by CNNs over Make3D and NYU Depth datasets.

Research Assistant   Summer and Fall 2015
IUT, Isfahan, Iran

- I developed a traffic surveillance system to detect and track vehicles using Computer Vision and Machine Learning methods including AdaBoost, Random Forests, SVM, and CNNs using OpenCV and python libraries

Reviewing Experiences	• AI for Social Goods ICLR 2019 Workshop • AI for Social Goods ICML 2019 Workshop
Selected Projects	

Representation Learning (IFT6135- Mila)

- **Sequence Models:** We trained and analyzed three generations of sequence models including RNN, GRU, and Transformers over text classification and generation problems.
- **Generative Models:** We implemented JSD, WGAN-GP, and trained a VAE and a GAN on the SVHN dataset to perform qualitative and quantitative comparison including FID score and disentanglement analysis.
- **Neural Networks:** We implemented an MLP and a CNN architectures to find the best-performing model on an image classification problem.

Deep Learning Specialization (Coursera)

- In this 5 course series, I learned and coded Machine Learning and Deep Learning techniques including Logistic Regression, Deep Neural Networks, Regularization methods, Error analysis, Gradient checking, bias-variance analysis, Face Verification and Recognition, Object Detection (YOLO), Residual and Inception networks, Sequence models for NLP tasks including learning Language models for Machine Translation, Word2Vec, (Deep) RNNs, LTSM, GRU, Attention models, Transfer Learning, Multi-task Learning, One-shot/ Few-shot Learning, and End-to-end Learning.

Applied Machine Learning (McGill University)

- I developed multiple machine learning projects using learning algorithms including KNN, linear and kernelized SVM, Naïve Bayes, Logistic Regression, Decision Tree, Random forest, NN, DNN, CNN, and RNN using python for different tasks and types of input and predictions. Complementary to the 3 assignments, in one project I worked on the detection of largest digit in a modified-MNIST dataset by implementing all possible ML baseline methods and CNNs where we were able to compare the behavior of different methods and reached to 96% accuracy. In the second project, we did ablation study of a proposed bi-directional RNN named TwinNet and reproduced the results.

Image Processing (Concordia University)

- I developed a pipeline to calculate contact-angle by segmenting drops on the solid surface, coded in MATLAB, using methods and techniques including image enhancement, noise reduction, Morphological processing, pixel processing, edge detection, and object segmentation in spatial and frequency domain.

Surgical Innovation

- **OstoMentor**: Through many hospital visits and talking with clinicians and patients, I and my two MD colleagues found an untouched need to help Ileostomy patients carrying stoma bags that comes from existing educational and communicational gap between the patients and existing health-care system. We proposed our novel solution, OstoMentor, to fill this gap by providing an education platform with communication features with the clinicians complemented by a marketing aspect to buy and sell supplies. As computer scientist of the team, I implemented our first version of the app using React-native, node-js, empowered by firebase database backend.

Skills and Tools	• **Deep Learning Frameworks:** PyTorch, TensorFlow, NumPy
	• **Programming:** Python, C, Java, MATLAB
	• **Software Engineering:** UML, Visual Paradigm, Doxygen
	• **Other Frameworks:** OpenCV, Spring, Hibernate, Sphinx, Quartz, ESPER, Qt
	• **DB Technologies:** MS SQL Server, PostgreSQL, SQLite, Data Warehouse, XQuery, QGIS
	• **Other Tools:** Git, Docker, React Native, Balsamiq, MS Projects, PyCharm, LaTeX
	• **Operating Systems:** Linux, Windows

Related Courses

Representation Learning, Applied Machine Learning, Image Processing, Artificial intelligence, Software Engineering I & II, Databases I & II, Webservice Development with J2EE, Project Management, Compilers, Operating Systems

Honors and Awards

- NSERC CREATE scholarship as a member of Surgical Innovation program
- Dr. T. Radhakrishnan In-Course Graduate Bursary in Computer Science, Concordia University.
- Concordia university Merit Entrance scholarship
- Merit-based Admission offer to the MSc program, at IUT without participating in the Nationwide University Entrance Exam (Declined).
- Ranked Top 10 percent students in Computer Engineering at IUT
- Ranked Top 0.6% among more than 260,000 participants in Iranian Undergraduate nationwide entrance exam ("Konkoor") for B.Sc.
- Elected member of Scientific Society of Computer and IT in IUT from 2013-2016; Appreciated by Ministry of Science, Technology, and Research in 2016 as one of the best scientific societies among all universities.
- Championed as a member of IUT's swimming team in 2014 and 2016 and winning several individual medals in the competition among the universities of Iran.

Volunteer Experiences	Neural Information Processing Systems (NeurIPS)	Dec 2018
	Computer & IT Scientific Society	Jan 2013- Sep 2016

Language	English, French, Persian
Hobbies	Swimming, Chess, Travelling, Music, Board games and cards

References available upon request