Mehrzad Mortazavi

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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 Technolog

Research & Development Experience

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

- As a member of Dr. Fevens lab, my research is focused on medical imaging and assistive technologies using Deep Leaning techniques.

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 Convolutional Neural Networks(CNNs) implemented by Caffe and Digits frameworks to detect brain tumors on the BRATS dataset processed by an image processing pipeline coded in MATLAB and python with 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 using Make3D and NYU Depth datasets.

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

- The company's flagship product is MY01 which senses the muscle's pressure and sends data with Bluetooth to the cloud. In this project, I worked alongside our development team to research, design, and implement a fully-automated and documented unit-testing platform for ARM powered MCU using Unity, CMock, Ruby, Make, Python, JavaScript, Gitlab CI/CD, Docker. Since MY01 is a medical device, my work needed to follow regulatory standards and quality assurance protocols including 510K FDA approval, HIPPA compliance, GDPR, and ISO.

Intern Summer 2016
ITRI, Hsinchu, Taiwan

- I developed Deep Neural Networks in multiple states of the art image classification problems and proposed an optimization guideline to choose hyper-parameters intuitively for the users of a DNN IDE; In this project, I used Caffe, Nvidia DIGITS, and DeepVis frameworks on MNIST, CIFAR10, and CIFAR100 datasets, under the supervision of Dr. Tzi-cker Chiueh.

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 pyton libraries under the supervision of Dr. Safyani

Skills and Tools

- **Machine Learning Frameworks:** Numpy, scikit-learn, Tensorflow, Keras, PyTorch, Caffe, Digits, DeepVis, TesorFlow
- **Programming:** Python, Java, C/C++, Make, Bash C#, Prolog, Android, MATLAB, Assembly (AVR), , R, HTML, CSS, JSF, SQL, EPL
- **Software Engineering:** UML, Visual Paradigm
- **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, MS Visual Studio, IntelliJ, PyCharm, Eclipse, QtCreator, Code Vision, AVR Studio, Proteus
- **Operating Systems:** Linux, Windows

Selected Projects

Deep Learning Specialization (Coursera)

- In this 5 course series, I learned and coded machine learning and deep learning topics 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

- I developed multiple machine learning projects using learning algorithms including KNN, 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 our first project I worked with my teammates on classification of modified-MNIST dataset by implementing all possible ML baseline methods and CNNs where we were able to compare 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

- 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 realized about a significant challenge for 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 marketable solution, **Ostomentor,** to fill this gap by providing an education platform with communication features with the clinicians and also a marketing aspect to buy and sell supplies. In this 8-month project, I implemented our first version of the app using React-native, node-js, empowered by firebase database backend.

Web-service development

- Developed an order management system with authentication and authorization procedures by J2EE and related technologies (Sprint, Hibernate, Quartz and etc).

Artificial Intelligence

- Developed an intelligent chess player that could play with human or other codes with Min-Max algorithm.
- Wikipedia logs analysis using ESPER event series analysis engine in Java and EPL, looking for specified events in the determined time interval.

Software Engineering

- Designed and developed a SAAS for cinema ticket reservation connecting four web services including Reservation, CRM, Management, and Payment in Django and J2EE.

Database

- Designed and implemented a Business Intelligent dashboard and related data warehouse for a sales company using MS SQL server and MS Data Warehouse.

Honors and Awards

- NSERC CREATE funding as a member of Surgical Innovation program
- Dr. T. Radhakrishnan In-Course Graduate Bursary in Computer Science, Concordia University.
- Concordia university Merit Entrance scholarship
- Ranked Top 10 percent students in Computer Engineering at IUT
- Merit-based Admission offer to the MSc program, at IUT without participating in the Nationwide University Entrance Exam (Declined).
- 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.

Teaching Assistantship

Mobile Video Processing (Graduate) — Summer 2018

- Tutorial lectures about OpenCV in Android
- Problem solving in Python, Matlab, C++ (OpenCV), and Java (Android projects)

Advanced programming in Java at Concordia University (Under-graduate) — Winter 2018

- Tutorial lectures
- Laboratory instructor
- Marker
- Designing TA lectures

Data Structures course teaching assistant at IUT (Under-graduate) — Fall 2014, Spring 2015

- Tutorial lectures
- Designing and marking assignments

Advanced Programming in C++ (Qt) (Under-graduate) — Fall 2013, Spring 2014
laboratory instructor and teaching assistant at IUT

Language English, French, Persian

Hobbies Swimming, Chess, Travelling, Music, Cards

References available upon request