

MOHAMMAD HOSSEIN EYBPOSH

hebi@live.unc.edu | m.h.eybpoosh@gmail.com | USA: (+1) 408-707-6690

RESEARCH INTERESTS

- Fundamental research in machine learning for biomedical applications.
- Deep learning with small datasets
- Medical image and signal analysis.
- Generative models and Representation learning from biomedical data (images, signals, etc.)

EDUCATION

University of North Carolina at Chapel Hill

Ph.D., Biomedical Engineering

NC, USA

Expected Graduation: Aug. 2023

Sharif University of Technology

M.Sc., Biomedical Engineering

Tehran, Iran

Graduation: Dec. 2017

- GPA: 3.74 / 4.00
- **Ranked FIRST** at Iran's National Entrance Exam for Graduate Studies

Isfahan University

B.S., Biomedical Engineering

Isfahan, Iran

Graduation: Sep. 2014

- **Cumulative GPA:** 3.12 / 4.00, **Senior GPA:** 3.61 / 4.00
- **Ranked Top 1%** at Iran's National Entrance Exam for Undergrad Studies

RESEARCH & WORK EXPERIENCE

University of North Carolina at Chapel Hill

Research Assistant

Sep. 2015 – Present

Title: "Neuro-degenerative Disease Diagnosis using functional MRI imaging and Convolutional Neural Networks", Prof. Shen

- I am developing a deep learning model for the classification of fMRI images. The method consists of a generative model for representation learning from BOLD signals and a CNN for classification.

Sharif University of Technology

Master of Science

Sep. 2015 – Present

Dissertation: "3D Representation Learning for Radiomics Using Deep Learning Methods", Dr. Fatemizadeh

- Developing 3D representation learning methods – using convolutional neural networks for describing brain tumors and disentangling the cancer related factors from 3D CT scans.

Wayne State University, Michigan – US

Research Assistant

Jun. 2017– Present

Project: Speckle Noise Reduction in OCT Images, Dr. Nasirivanaki

- Developed a speckle reduction framework that significantly improves the performance of common filtering methods (published in Biomedical Optics Express, Impact Factor: 3.34).
- Developed a registration-based despeckling method. The method will be sold to an OCT manufacturing company.

Sharif University of Technology

Biomedical Signal and Image Processing Lab

Jun.– Jul. 2017

Finalist in Automatic Cardiac Diagnosis Challenge (ACDC), MICCAI 2017

- Developed a novel fully convolutional network for segmentation of cardiac structures (I had to withdraw the paper since I could not attend. The manuscript is available on [arXiv](https://arxiv.org/abs/1706.02422).)

Wayne State University, Michigan – US

Research Assistant and Adviser

Apr.– Jun. 2017

Project: *Designing High-Speed Data Acquisition Systems for Photoacoustic Imaging*, Dr. Nasiriavanaki

- Defined the problem statement of the project, selected the hardware, and developed a PC software in C# to capture and display the data.
- I am also advising two students to investigate the feasibility of microcontroller-based DAQs in megahertz data capturing for small-scale and portable photoacoustic imaging systems.

Medrik Dynamic Technology

Computer Vision Data Scientist

Nov. 2016 – Apr. 2017

- Developed a software for tracking the heart's myocardium through the cardiac cycle. The software consisted of two main stages, namely segmentation of the LV and its temporal tracking.

Sharif University of Technology

Printed Circuit Board Engineer / Electronics and Embedded Systems Adviser

Summer 2016

- Designed Printed Circuit Boards (PCBs) for a dam control system. Advised and mentored a MSc. student on the electronics of the system. The project was funded by the Ministry of Agriculture.

Isfahan University

Sep. 2009 – Aug. 2014

BS. Project: *Using Near Infrared Spectroscopy (NIRS) to Detect Brain Hemodynamics*, Dr. Mohamadbeygi

- Built a complete continuous wave NIRS system. The system consisted of the hardware for LED control, data capture and data transfer, as well as a PC software (in C#) for data processing and presentation.

Isfahan University

Research Assistant

Fall 2013

Project: *A Data-driven Decision Support System (DSS) for Neuromuscular Disorders (NMD) Diagnosis*

- Conducted a systematic review of the literature on the topic (presented in the 5th *International Congress on Newest Research Achievements in Medical Sciences*).
- Developed a set of features describing the firing pattern of MUAPs, and applied a number of classifiers to examine explanatory power of these features.

Isfahan University

Software Developer

Summer 2013

Project: *An Electro-Oculography (EOG) based Brain-Computer Interface (BCI) System*

- Ported algorithms for a novel wearable EOG-based BCI system from MATLAB to C# programming language.

Kashani Hospital

Support Engineer Intern

Summer 2012

- Developed a novel timer and history logging device for controlling and fault detection of UV sterilization lamps.

Selected Course Projects

- **Computer Vision in Smart Environments (M.Sc.):** First project: facial alignment using histogram of gaussian (HOG) and local binary pattern (LBP) and support vector machine (SVM). Second project: facial expression classification using CNN. (Prof. Hamid Karbalayi-aghajan, Fall 2016)
- **Biomedical Signal Processing (M.Sc.):** used common spatial pattern for surface EMG channel selection. (Prof. Sepideh Hajipour, Spring 2015)
- **Statistical Pattern Recognition (M.Sc.):** participated in Kaggle's "Winton Stock Market Challenge" as the course's final project. Ranked First in the class, and 221st/832 in the leaderboard. (Prof. Emad Fatemizadeh, Fall 2015)
- **Electromyographic Signal Processing (B.S.):** performed statistical analysis of motor unit action potential firing times in healthy subjects and patients with neuromuscular disorders. (Prof. Hamid-reza Marateb, Spring 2012)
- **Biomedical Signal Processing (B.S.):** developed a diagnostic system for cardiac arrhythmia classification. (Prof. Hamid-reza Marateb, Spring 2013)

Selected Kaggle Competitions

- Cats vs Dogs: 98th among 1314 participants.
- Winton Stock Market Challenge: 221st among 832 participants. Ranked 1st among 28 classmates.

Paper Reviews

- Reviewed two papers for *Advanced Biomedical Research Journal* and *Basic and Clinical Neuroscience*.

Teaching

- Online workshop on Deep Learning, Biomedical Engineering Department, Wayne State University, US.
- Workshop on Deep Learning, Biomedical Engineering Department, Sharif University of Technology, Iran.
- Teaching Assistant, Medical Image Analysis and Processing (Graduate), Spring 2017.
- Teaching Assistant, Statistical Pattern Recognition (Graduate), Fall 2017.

PUBLICATIONS

Conferences

- [1] **Eyboosh MH**, Hagher M., Jalilpour M., Saboksayr S., “Segmentation and Classification of Cine-MR Images Using Fully Convolutional Networks and Handcrafted Features,” accepted to the *ACDC challenge, MICCAI 2017*, withdrawn, ([arXiv:1709.02565](https://arxiv.org/abs/1709.02565))
- [2] **Eyboosh MH**, Eyboosh S. (2015), “Applicability of EMG-based Computerized Classifiers for Discriminating Myopathic, Neuropathic, and Healthy Individuals: A Systematic Review”. *5th international congress of Dr Yalda (newest research achievements in medical science), 2014, Tehran, Iran*.

Journals

- [3] **Eyboosh MH**, Turani Z., Mehregan D., Avanaki MRN., “[Cluster-based filtering framework for speckle reduction in OCT images](#),” *Biomedical Optics Express*, Biomed. Opt. Express 9, 6359-6373 (2018)
- [4] **Eyboosh MH**, Zhan H., Liu M., Shen DG, “fMRI Classification using Temporal Ensemble Averaging, Variational Autoencoder, and Convolutional Neural Networks” (working paper)
- [5] **Eyboosh MH**, Fatemizadeh E., “RadioNet: A Deep Multi-Task Learning Framework for Disentangling Cancer-Related Factors from 3D Tumor Volumes and Radiomics Learning,” *Medical Image Analysis* (working paper)

Selected Courses and Grades

Undergraduate: Computational Intelligence (4/4), Biostatistics (3/4), Biomedical Signal Processing (4/4), Electromyographic Signal Processing (4/4), Computer Networks (4/4), Bioinstrumentation (4/4).

Graduate: Statistical Pattern Recognition (4/4), Computer Vision in Smart Environments (4/4), Medical Image Analysis and Processing (4/4), Biomedical Signal Processing (3/4), Advanced Bioinstrumentation (4/4).

Online Courses: Linear Algebra (MIT), Machine Learning (Caltech), Deep Learning (fast.ai), Deep Learning (Udacity), Convolutional Neural Networks for Visual Recognition (Stanford).

QUALIFICATIONS & ACTIVITIES

Test Scores:

- **TOEFL:** Reading: 30, Listening: 30, Speaking: 27, Writing: 28 (Overall: 115)
- **GRE:** Q: 168, AW: 3.0, V: 143 (taken in Feb. 2014)
Q: 160, AW: 4.0, V: 154 (taken in Dec. 2017)

Programming Skills: Python, MATLAB, C#, C++, C

Frameworks and Tools: Tensorflow, Keras, OpenCV, SimpleITK, Scikit Learn, Scikit Image

Technical Skills: data acquisition system design, ARM microcontroller programming, and PCB design in Altium.

REFERENCES

Dr. Emadeddin Fatemizadeh

Biomedical Engineering, Sharif University of Technology
Email: fatemizadeh@sharif.edu

Dr. Mohammad Nasirivanaki

Biomedical Engineering, Wayne State University
Email: ft5257@wayne.edu

Dr. Mehran Jahed

Biomedical Engineering, Sharif University of Technology

Email: jahed@sharif.edu

Dr. Amin Mahnam

Biomedical Engineering, University of Isfahan

Email: mahnam@eng.ui.ac.ir