MORTEZA HOSSEINIOUN

Curriculum Vitae, May 2022

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Education

2016 - 2019 **M.Sc. in IT, Computer Networks**, *Sharif University of Technology*, Tehran, Iran, GPA: 3.88/4 (17.65/20).

2013 - 2015 **B.Sc. in Software Engineering**, *Khayyam University of Mashhad*, Mashhad, Iran, GPA: 2.85/4 (14.28/20).

2010 - 2012 **Associate in Computer- Software**, *Neyshabour Technical College For Boys*, Neyshabour, Iran, GPA: 2.88/4 (14.43/20).

Master Selected Courses and Grades

Research Interest

Deep Learning, Machine Learning (based on graph analysis), Network Science, Complex Networks, Data Science, Sport Analysis.

Accomplishment & Awards

Jan 2019 ***Ranked 2nd (among class entries)*** in M.S. program based on cumulative GPA, School of Science & Technology, Department of Computer Engineering, Sharif University of Technology.

Publications

Working Papers

Detecting Community Structures in Patients with Peripheral Nervous System Disorders., *M. Hosseinioun*, A. M. A. Hemmatyar, A. Movaghar, S. Ahmadifar, S. A. G. Ghahramani*, * et al. and primary author., Under Preparation.

Nowadays, bipartite networks are being highly used to model different networks. In this research, we focused on patients suffering the Peripheral Nervous System disorders. We tried to represent the relationship between patients and their symptoms as a Bipartite Network. Such bipartite networks exhibit an imbalance in terms of the size of their two disjoint sets of nodes. The main objective of this research was to propose new algorithms for Community Detection in such networks. To this aim, required Data Sets have been collected by the cooperation of Spinal Specialty Clinics. In our algorithm, called MRComSim, three different methods are used to project the bipartite graph to unipartite graph. Then the projected unipartite graph of each technique is used for Community Detection. The output result of our algorithm is in agreement up to 85.90% with the Diagnosis of Doctor (DofD).

Peer-review Journal Article

Classification and Segmentation of Pulmonary Lesions in CT images using a combined VGG-XGBoost method, and an integrated Fuzzy Clustering-Level Set technique., *N. Akhavan Javan, A. Jebreili, B. Mozafari, M. Hosseinioun*, (arXiv), Under Review.

Given that lung cancer is one of the deadliest diseases, and many die from the disease every year, early detection and diagnosis of this disease are valuable, preventing cancer from growing and spreading. So if cancer is diagnosed in the early stage, the patients life will be saved. However, the current pulmonary disease diagnosis is made by human resources, which is time-consuming and requires a specialist in this field. Also, there is a high level of errors in human diagnosis. Our goal is to develop a system that can detect and classify lung lesions with high accuracy and segment them in CT-scan images. In the proposed method, first, features are extracted automatically from the CT-scan image; then, the extracted features are classified by Ensemble Gradient Boosting methods. Finally, if there is a lesion in the CT-scan image, using a hybrid method, including Fuzzy Clustering and Level Set, the lesion is segmented. We collected a dataset, including CT-scan images of pulmonary lesions. The target community was the patients in Mashhad. The collected samples were then tagged by a specialist. We used this dataset for training and testing our models. Finally, we were able to achieve an accuracy of 96% for this dataset. This system can help physicians to diagnose pulmonary lesions and prevent possible mistakes.

Academic and Research Experience

Sharif University of Technology

2020 – present **Predicting effectiveness in Chiropractic-based treatment with Deep Learning application.**, *Senior Researcher*, Advisors: Dr. A. Ghahramani & Dr. H. Samiee, Samiee Chiropractic Center.

The idea of this study is to analyze and classify the patient's Cervical images so that the effectiveness of the Chiropractic could be predicted. This method can be utilized to help physicians decide whether this method of treatment could help the patients which can result in saving time and costs.

Fall 2020 **Research Assistant in Machine Learning with Graphs,**, *Research Assistant*, Advisor: Dr. Amirali Ghahramani, AIDA Lab.

Contributed to multiple works : Held various meetings with the instructor to designed projects, helped TAs team in correcting students practices, Designed a grading analysis system and selecting students for questions and answers, Provide several classrooms for students.

Fall 2018 **Teacher assistant in Computer Networking**, *Teacher Assistant*, Advisor: Dr. Siavoshani, Department of Computer Engineering.
Designed assessment models for undergraduate students with a team of 12 TAs, including the instructor and teacher assistants in one semester.

2017 – 2020 **Master's Thesis**, *Senior Researcher*, Advisors: Dr. Hemmatyar & Dr. Movaghar.
Detecting Community structures in patients with Peripheral Nervous system disorders. I have worked on a research project as my thesis entitled "Detecting Community Structures in Patients with Peripheral Nervous System Disorders", in Dr. Hemmatyar and Dr. Movaghar's lab to model the human nervous disease processes utilizing network science (Bipartite Networks). I spent two summers at v, where I had the chance to collaborate with the medical team to discover new ideas and they provided me with personal data of the patients and enriched me with fruitful discussions. The results of our algorithm afterward, have been compared with the results of medical analysis.

Fall 2017 **Teacher assistant in Distributed algorithms,**, *Teacher Assistant*, Advisor: Dr. Kaveh Kavousi.
Provided part of the classroom for undergraduate and graduate students, assessed students by personally designed models in the semester.

Work Experience

Dec 2021 - Present **Researcher**, *Artificial Intelligence and Data Science Lab*.
Cooperation with Samiee Chiropractic Center to make a system to analyze and detect the problem of the patient's body through their MRI or CT scans. All of the above procedures will be based on the Neurology viewpoint and Machine Learning.

Jan 2019 - Present **Researcher**, *Samiee Chiropractic Center*.
Cooperating with AIDA lab to gather, wrangle, and preprocess patient data to find the effectiveness of Chiropractic-based treatment with a Deep Learning application.

Summer 2017, 2018 **Scientific Intern**, Samiee Chiropractic Center.
Contributed to the medical team to collect data, discussion to learn more about the Peripheral Nervous System, designed and developed several key components for the Data-collecting system in the office, with a focus on the scalability challenge.

Fall 2017 **Deputy Executive Secretary in CADS'17**, 19th International Symposium on Computer Architecture and Digital Systems.
Reviewed some papers submitted for admission to the conference, admission of approved people at Sharif University (Kish International Campus)

2015 – 2019 **Chief Technology Officer**, Autra Burners Co..
Autra Company manufactures gas burners, diesel burners, single burners, and multi burners. Their products range from heavy burners to small, lightweight burners used fully in the food and home industries. These enterprises can be seen in making cookies, making fruit leathers, making lollipops, and home heating applications. My job was to ensure the proper functioning of all Computer systems, including Computer Server, Website, Warehouse Management System, and other hardware, daily. I also assessed optimized solutions processes for the Informatics section and constantly offered a vision along with career turnover and motivational projects for future careers, which were essentially based on Computer Science. This idea led me to work with managers to identify trends and development that might influence the Informatics department.

2011 – 2015 **Senior Content Manager**, Autra Burners Co..
programmed and developed company website, designed and developed Factory warehouse management system,

Online Courses

Present **PyTorch, Farsi**, *In Progress*.
Practical training from scratch, Teacher coding while teaching, MLP neural network training in PyTorch with practical project, Training in convolutional neural network with advanced techniques and practical project, Recursive neural network training in PyTorch with project, Implementation of a combined canonization and return project in PyTorch, Teaching basic concepts for beginners (such as defining a programming language, library or framework, IDE, etc.), Training in installing the necessary software and libraries.

Present **Make Your First GAN Using PyTorch**, *In Progress*.
This course provides an introduction to Generative Adversarial Networks (GANs) and a step-by-step guide to building your own with PyTorch. Candidates will learn how to construct GANs using industry-standard tools through this course.

Present **Data Visualization**, *In Progress*.
Make great data visualizations. A wonderful example of the power of coding!

Present **Intro to Deep Learning**, *In Progress*.
Use TensorFlow and Keras to build and train neural networks for structured data.

May 2022 **Machine Learning Deep Learning in Python R**.
Covers all essential aspects of Machine Learning and Deep Learning, such as Regression, Decision Trees, SVM, Neural Networks, CNN, and Time Series Forecasting, using Python and R. Achievements: Certificate.

April 2022 **Machine Learning- From Basics to Advanced**.
Examined concepts on NumPy, fast mathematical calculations, Data Wrangling, scikit-learn for data-preprocessing, model selection and feature selections techniques, cluster analysis, anomaly detection, SVMs for classification, regression and outliers detection in Machine Learning. Achievements: Certificate.

August 2020 **CS224W: Machine Learning with Graphs**.
Observed on course focuses on the analysis of massive networks which provide several computational, algorithmic, and modeling challenges.

July 2020 **Machine Learning**.
Part of course until session 8 by Tom Mitchell. Carnegie Mellon University.

June 2020 **Deep Learning Specialization.**.
Part of Neural Networks and Deep Learning course by Andrew Ng. on Coursera.

April 2020 **Data Analysis**.
Learned to Import data sets, clean and prepare data for analysis, manipulate pandas Data Frame, summarize data, build machine learning models using scikit-learn. Build data pipelines. Achievements: Certificate.

April 2020 **Data Science**.
Courses materials based on Python Basics, Python Data Structures, Python Programming Fundamentals, Working with Data in Python. Achievements: Certificate.

April 2020 **Deep Learning**.
Participated on course based on Classic image processing, Neural networks, Convolutional networks, Recommender system, object Detection and Classification, GAN, Keras and Tensor flow and OpenCV libraries. Ng.

April 2020 **Blockchain**.
Partaken in the course with syllabus about blockchain, BitCoin network, Etherium network, and Mining strategies.

Skills

Programming Languages: **Python, Matlab, C/C++, C, IEEE GPSS, 80x86 Assembler, PHP, mySQL, HTML and App Programming.**

Scientifc packages: **Stanford Snap, PyTorch, Graph Neural Networks, Open Graph Bench- mark, Matlab BiMat package, Anaconda, D2L.**

Office software: **LaTex, Microsoft Oce, Visual Studio, Visual basic.**

Operating systems: **Windows, MacOS, DOS, and Linux.**

Language

Persian **Native proficiency**

English **Full professional proficiency**, Duolingo (Certificate.): 120 (Literacy: 115, Comprehension: 125, Conversation: 110, Production: 100), TOEFL: Due Date for the Test is July 23, 2022.

French **Limited working proficiency**

Selected Courses

Graduate Courses

Advanced Computer Network, *Sharif University of Technology*: 4/4 (18.6/20)
Machine Learning with Graphs (Complex Networks), *Sharif University of Technology*: 4/4 (18/20)
Data Communications, *Sharif University of Technology*: 4/4 (18/20)
Distributed Algorithms, *Sharif University of Technology*: 4/4 (19/20)
Network Security, *Sharif University of Technology*: 4/4 (18.5/20)
Performance Evaluation, *Sharif University of Technology*: 4/4 (18.6/20)
Wireless Communications, *Sharif University of Technology*: 3/4 (14.1/20)
Wireless Networking, *Sharif University of Technology*: 4/4 (17/20)

References

Dr. Ali Mohammad Afshin Hemmatyar
- *Assistant Professor, Department of Computer Science and Engineering,*
Sharif University of Technology
- *Head of Information Technology group*
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Dr. Kaveh Kavousi
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- *Head of group in Kish- Campus*
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