Mohammad Hadi Mehdizavareh

Machine Learning Scientist

(+98) 9387750474 Tehran, Iran
mhzavareh90@yahoo.com Scholar hadimehdizavareh

Summary

I have solid backgrounds and education in the machine learning (ML) and signal processing fields. With 5+ years of experience of working on ML, I have devoted about 3 years of this time to research and published 3 high-quality papers. I have also participated in 5 large or complex ML-related competitions and won 3 awards. In addition, I have done several projects in this field as a freelancer and have been involved with many ML and data science tools and frameworks.

Experiences

Academic Experiences

- **Remote Machine Learning Researcher**, *KIMIA Lab (Laboratory for Knowledge Inference in Medical Image Analysis), Waterloo, Canada* [Nov 2019 – May 2021]
  - Inspected more than 50 papers including notable spectral hashing algorithms used for large-scale image retrieval tasks and best practices for implementing them.
  - Developed and publicized all the competitive hashing methods from scratch in Python based on their respective papers.
  - Implemented our group's proposed algorithm (Efficient Spectral Hashing).
  - Co-authored two published papers based on our research.
- **BCI Researcher**, *University of Tehran, Tehran, Iran* [Sep 2017 – Sep 2018]
  - Received a research grant for my thesis which was awarded by the Cognitive Sciences and Technologies Council (COGC) in 2017.
  - Performed a literature review of about 70 papers on speller BCIs (brain-computer interfaces) topic.
  - Used a public EEG dataset collected for speller systems to compare SOTA methods (mostly based on canonical correlation analysis or CCA). All algorithms were implemented from scratch in MATLAB.
  - Conceptualized the idea of knowledge translation in the BCI field for enhancing target detection accuracy. The EEG data of other patients were used for hyperparameter tuning of a patient-specific model.
  - Improved the highest information transfer rate (ITR) by about 10%. The proposed approach was published in a high-quality journal.
- **Teaching Assistant**, *University of Tehran, Tehran, Iran* [2017]
  - *Digital Image Processing* (Spring 2017) with Professor Hamid Soltanian Zadeh.
  - *Pattern Recognition* (Fall 2017) with Professor Babak Nadjar Araabi.
  - *Speech Processing* (Fall 2017) with Professor Reshad Hosseini.

Work Experiences

- **Co-founder and Machine Learning Researcher,** *Tehran, Iran* [Jun 2021 – Nov 2022]
  - Co-founded a startup to create a social app for movie and TV recommendations.
  - Designed and developed several unsupervised recommendation algorithms, solely based on movie information (e.g. plot, production year, cast).
  - Designed and created a relational database schema based on TMDB data (The Movie Database or TMDb is a popular user-editable database for movies and TV shows). The PostgreSQL database was used for this part of the project.
  - Developed an ETL (extract, transform, load) pipeline manually to build and maintain a unified relational database of movies and TV series. Python, Django, pandas, and PostgreSQL were used for this part.
  - Added logging and caching mechanisms to the ETL part.
  - Gained non-related skills to my background (e.g., backend development, fundamentals of marketing, business model generation, object-oriented programming).
- **Freelancer (AI and Machine Learning)** [Apr 2020 -– Jul 2020]
  - Successfully completed a project involving a molecular dynamics package and a customized autoencoder written in PyTorch. Only a few freelancers could take on the project due to the complexity and high level of uncertainty.
  - Collaborated with the employer and understood the problem in spite of having zero knowledge of molecular dynamics.

Education

- **M.Sc. Biomedical/Bioelectric Engineering, University of Tehran** [2015 – 2018]
  - Thesis title: *Designing a steady state visually evoked potential based brain computer interface for a speller system*
  - GPA: 17.58/20.00
  - Selected courses: *Pattern Recognition* (top mark), *Speech Processing* (top mark), *Biological Signal Processing*, *Digital Image Processing*, *Digital Signal Processing*, *Biological System Modeling*
- **B.SC. Electrical/Electronics Engineering, Shahid Rajaei Teacher training University** [2011 – 2015]
  - Thesis title: *Channel equalization with adaptive filter algorithms*

Research Publications

1. M. H. Mehdizavareh, S. Hemati, and H. Soltanian-Zadeh, "Enhancing performance of subject-specific models via subject-independent information for SSVEP-based BCIs," *PLOS ONE*, vol. 15, no. 1, X. Gao, Ed., e0226048, Jan. 2020. DOI: 10.1371/journal.pone.0226048.
2. S. Hemati, M. H. Mehdizavareh, S. Chenouri, and H. R. Tizhoosh, "A non-alternating graph hashing algorithm for large-scale image search," *Computer Vision and Image Understanding*, vol. 219, p. 103 415, 2022, ISSN: 1077-3142. DOI: https://doi.org/10.1016/j.cviu.2022.103415.
3. S. Hemati, M. H. Mehdizavareh, M. Babaie, S. Kalra, and H. Tizhoosh, "A simple supervised hashing algorithm using projected gradient and oppositional weights," in *2021 IEEE International Conference on Image Processing (ICIP)*, 2021, pp. 2748–2752. DOI: 10.1109/ICIP42928.2021.9506441.
4. M. Kamarzarrin, S. Ehsan Hosseini, M. Hadi Mehdi Zavareh, and M. Kamarzarrin, "Designing and implementing of improved cryptographic algorithm using modular arithmetic theory," *Journal of Electrical Systems and Information Technology*, vol. 2, no. 1, pp. 14–17, 2015, ISSN: 2314-7172. DOI: https://doi.org/10.1016/j.jesit.2015.03.002.

Skills

Programming Languages	Python, SQL, MATLAB
Machine Learning Frameworks and Libraries	Keras, Pytorch, Tensorflow, NumPy, Matplotlib, pandas, scikit-learn, SciPy
Data Science Technical Skills	Mathematics, Statistics, Data Analysis
Data Science Soft Skills	Problem Solving, Active Learning, Critical Thinking, Collaboration, Generating Hypotheses
Others	Academic Research, Django, Git, PostgreSQL, Linux

Awards and Achievements

- **Bronze Medal** - Top 7% (154/2435) in **Severstal: Steel Defect Detection** Competition. Issued by Kaggle [2019]
- Won **the third prize** of the **2nd National Brain Computer Interface Competition** (contested by 70 teams) [2018]
- Won **the Third Great Prize** in **stock price prediction challenge** (contested by 48 teams) [2017]
- Top 1% in nationwide graduate university entrance exam in electrical engineering, biomedical discipline [2015]

Other Activities

- **Reviewer** for 2023 IEEE International Conference on Image Processing (ICIP 2023)
- **Member** of Iranian Society of Biomedical Engineering Student Branch, University of Tehran [2016 – 2018]
- **Chief Editor** of Biotech Magazine, University of Tehran [2017]