Mohammad Hadi Mehdizavareh
PhD Candidate

(+45) 31878309 Aalborg, Denmark
mhme@cs.aau.dk Scholar hadimehdizavareh

Summary

PhD candidate at Aalborg University with 7+ years of experience in machine learning and signal processing, now applying these skills to healthcare data analysis. My research explores predictive modeling for critical care using electronic health records (EHRs), aiming to improve outcomes for ICU patients. I actively contribute to the Danish academic environment through interdisciplinary student supervision, research-based teaching, and peer reviewing for major conferences. My work supports the development of predictive tools that can enhance clinical decision-making and are well-suited for countries with advanced digital healthcare infrastructure.

Experiences

Academic Experiences

- **PhD Researcher**, *Department of Computer Science, Aalborg University (AAU), Denmark* [Aug 2023 – present]
  - Researched deep learning methods for analyzing ICU patient data using heterogeneous and irregular electronic health records (EHRs), focusing on predictive modeling for critical care scenarios.
  - Published the first paper in the domain, which addresses time-series forecasting of blood glucose levels using multi-source ICU data. The study tackles challenges such as data inconsistencies, irregular sampling rates, and large data volume (paper, codebase).
  - Built a proof-of-concept interactive (demo server) to showcase real-time prediction results from the developed model. Such systems, if extended and clinically validated, have the potential to assist healthcare professionals with interpretable risk assessments in critical care.
  - Authored and currently developing a second scientific paper, advancing clinically relevant machine learning applications and expanding on foundation model design for ICU time-series and multimodal health data.
  - Completed 28.5 ECTS credits of PhD-level coursework, with a focus on entrepreneurship and transferable skills, including "Young Researcher Entrepreneurship Bootcamp (YREB)," "Management of Technology and Innovation," and "Project Management and Interpersonal Skills," alongside technical courses such as "Self-Supervised Learning" and "Big Data Integration."
  - Supervised bachelor's and master's project groups (3–6 students each) in both the Computer Science and Health Science and Technology departments under AAU's Problem-Based Learning (PBL) framework.
  - Actively engaged in academic service as an external reviewer for top-tier data management and ML conferences, including SIGMOD (2024–2025), ICDE 2024, and VLDB 2025.
- **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.

Experiences (continued)

- **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).

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*

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]

Research Publications

1. M. H. Mehdizavareh, A. Khan, and S. L. Cichosz, "Enhancing glucose level prediction of icu patients through irregular time-series analysis and integrated representation," *Computational and Structural Biotechnology Journal*, 2025, Accepted, in press. URL: https://arxiv.org/abs/2411.01418.
2. 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.

3 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.

4 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.

5 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.