Mohsen Nayebi Kerdabadi

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EDUCATION

Ph.D. in Computer Science   **Jan. 2022 - Present**
The University of Kansas (KU), Kansas, US

M.Sc. in Computer Science   **Jan. 2022 - May 2024**
The University of Kansas (KU), Kansas, US; CGPA: 4/4

B.Sc. in Mechanical Engineering   **Sep. 2016 - Mar. 2021**
Isfahan University of Technology (IUT), Isfahan, Iran; CGPA: 3.82/4

SKILLS AND INTERESTS

Research Interests: Health Informatics, Natural Language Processing (NLP), Large Language Models (LLMs), Computer Vision (CV), Representation Learning, Time Series Analysis, Survival Analysis

AI/ML Skills: Deep Learning (CNNs, RNNs [RNN, LSTM, GRU], Transformers), Graph Neural Networks (GNN, GCN, GAT, Hypergraph Convolution, Hypergraph Attention, Hypergraph Transformer), Generative AI (GANs, Autoencoders), Explainable AI, Recommender Systems, LLM Prompt Engineering, RAG, GPT, Llama, Adversarial Attacks, Counterfactual Explanations, Self-Supervised Learning, Contrastive Learning, Transfer Learning, Meta Learning, Data Analytics

Programming: Python, SQL, Matlab

Libraries: PyTorch, PyTorch Geometric, TensorFlow/Keras, Scikit-learn, Hugging Face, Pandas, Azure Databricks, OpenAI API, NumPy, SciPy, Matplotlib, Plotly, Seaborn, Git

EXPERIENCES

Graduate Research Assistant (the Jayhawk Data Science Lab (JDSL), KU)   **Jan 2022 - Present**
- Developed advanced deep learning architectures leveraging Transformers, Recurrent Neural Networks, Attention-based Sequential Models, Graph-based Networks, LLMs, and Generative Models, to address healthcare challenges such as survival analysis, diagnosis prediction, medical representation learning, model explainability, prescription recommendation system, etc.
- Developed novel adversarial and counterfactual perturbations to challenge the robustness of neural networks and elucidate their decision-making processes.
- Hands-on experience in handling and manipulating large-scale datasets, e.g. real-world Electronic Health Records (EHRs), Electrocardiography (ECG/EKG), Echocardiogram (Echo) datasets, demonstrating proficiency in dataset management and preprocessing.

Graduate Teaching Assistant (ME department, KU)
- Course: Advanced Data Science (EECS 835), fall 2024,
- Course: System Dynamics and Control Systems (ME 682), fall 2022, *video*
- Course: Mechanical Engineering Measurements and Experimentation (ME 455), Spring 2022, *video*

PUBLICATIONS

- **Mohsen Nayebi Kerdabadi**, Zijun Yao, OntoFAR: Hierarchical Multi-Ontology Fusion Better Augments EHR Representation," ICLR'25 | Submitted

- **Mohsen Nayebi Kerdabadi**, Bin Liu, Mei Liu, Zijun Yao, SurvAttack: Black-Box Attack On Survival Models through Ontology-Informed EHR Perturbation," SDM'24 | Submitted

- Arya Hadizadeh Moghaddam, **Mohsen Nayebi Kerdabadi**, Bin Liu, Mei Liu, Zijun Yao, Contrastive Learning on Medical Intents for Sequential Prescription Recommendation," CIKM'24 | *Paper*

- Arya Hadizadeh Moghaddam, **Mohsen Nayebi Kerdabadi**, Bin Liu, Mei Liu, Zijun Yao, Discovering Time-Aware Dependency in Electronic Health Records through Personalized Hidden Graph Inference," TKDD'24 | Submitted

- Jinxiang Hu, **Mohsen Nayebi Kerdabadi**, Joseph Cappeller, Richard Barohn, Zijun Yao, Recurrent Neural Networks and Attention Score for Personalized Prediction and Interpretation of Patient-Reported Outcomes," The Journal of Biopharmaceutical Statistics 2024 | Submitted

- **Mohsen Nayebi Kerdabadi**, Arya Hadizadeh Moghaddam, Zijun Yao, Forecasting Subjectively Observed Patient Reported Outcomes via Transformer-guided Soft Clustering-based Multi-task Learning," SDM'24 | Submitted

- Arya Hadizadeh Moghaddam, **Mohsen Nayebi Kerdabadi**, Zijun Yao, Meta-Learning on Augmented Gene Expression Profiles for Enhanced Lung Cancer Detection," AMIA'24 | *Paper*

- **Mohsen Nayebi Kerdabadi**, Arya Hadizadeh Moghaddam, Bin Liu, Mei Liu, Zijun Yao, Contrastive Learning of Temporal Distinctiveness for Survival Analysis in Electronic Health Records," CIKM'23 | *Paper*

AWARDS

- Robb Travel Award, The University of Kansas, Lawrence, KS   2024
- College of Engineering Scholarship Award, The University of Kansas, Lawrence, KS   2022
- Summer Research Scholarship Award, ME Department, The University of Kansas, Lawrence, KS   2022
- Ranked 1st in the Graduating Class, Isfahan University of Technology, Iran   2021
- National Undergraduate Full Scholarship, Iran   2016, 2021

PROJECTS

Ontology-augmented LLM-guided hierarchical Knowledge Graph for Enhanced Health Representation   **20234**
Graph-based attention model leverages Large Language Models to inject knowledge in health representation learning.

Contrastive Ontology-aware Healthcare Representation Learning   **2023**
Graph-based attention model meets contrastive learning to incorporate domain knowledge in representation learning.

Neural Program Synthesis-TransFill   **2023**
A transformer-based network is trained on input/output examples and learns to generate a program for string transformations.

Image Captioning   **2023**
Generating textual descriptions of images using a CNN-based encoder (ResNet50) and an attention-based LSTM decoder.

Image Generation using GAN   **2022**
Using GANs for data augmentation and image-to-image translation.

Write Shakespeare!   **2022**
Developed an LSTM-based NLP model trained on Shakespearean writings for generating text in Shakespearean style.

Dynamic Analysis of Cellular Lattice Structures (B.S. Thesis)   **2020**
Dynamic Analysis of Cellular Structures under high strain rate using Finite Element Analysis (Abaqus) and Machine learning.

SPECIAL COURSE CERTIFICATIONS

AI courses @ KU: Data Science (4/4), Machine Learning (4/4), Bioinformatics (4/4), Inference and Learning (4/4), Computer Vision (4/4), Program Synthesis (4/4), Deep Reinforcement Learning, Optimization

Coursera: Generative Adversarial Networks Specialization (*Specialization Cert.*, *Course1*, Course2, Course3*)*
Coursera: Deep Learning Specialization (*Specialization Cert.*, *Course1*, *Course2*, *Course3*, *Course4*, *Course5*)
Coursera: TensorFlow Developer Professional Certificate (*Professional Cert.*, *Course1*, *Course2* , *Course3*, *Course4*)
Coursera: AI for Medicine Specialization (*Specialization Cert.*, *Course1*, *Course2*, *Course3*)

REVIEWING SERVICES

- International Conference on Learning Representations (ICLR)
- Knowledge Discovery and Data Mining (KDD)
- Conference on Information and Knowledge Management (CIKM)
- SIAM International Conference on Data Mining (SDM)