Tahereh Fahi

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Education

Massachusetts Institute of Technology (MIT)
MicroMaster
Statistics and Data Science — *Sep 2022 – Apr 2024*
GPA: 4/4

Tarbiat Modares University, Tehran, Iran
Master of Science — *Aug 2015 – May 2017*
Information Technology Engineering- IT Systems
Ranked 1st
GPA: 3.92/4

K.N. Toosi University of Technology, Tehran, Iran
Bachelor of Science — *Sep 2009 – Oct 2013*
Industrial Engineering- System Analysis
Ranked 1st
GPA: 3.35/4

Research Interests

- Business Data Analytics
- Engineering Statistics
- Data-Driven Decision-Making
- ML for Multimodal Sensor Data
- Human–AI Interaction
- Predictive Modeling in Health and Behavioral Data
- Modeling Biological and Physiological Data
- Applications in Finance, Bioinformatics & Networks

Experiences

Tarbiat Modares University — **Tehran, Iran**
Graduate Research Assistant — *Aug 2016 – Aug 2017*
"Integrating a Local Feature Selection and a Modified PLR Method for Stock Trading Points Prediction" (GitHub)

- Tackled non-stationary, noisy financial time series by focusing on localized market behavior.
- Combined PLR-based time-series segmentation with Local Feature Selection to pick signals.

Roboself.ai — **Toronto, Canada**
Data Scientist — *Nov 2018 – Present*

- Developed algorithms to detect turning points in financial time series, improving early trend reversal prediction.
- Designed hybrid AI models combining NN, GA, PSO, and NSGA-II for multi-objective optimization.

Skillset

Languages: Python, R, C++, C#, MATLAB, MQL

Machine Learning Algorithms: Decision Tree, SVM, Linear Regression, Linear Programming, Clustering, Bayesian, Deep Learning, Gaussian Process, CNN, RL (Q- Learning)

ML Technologies: TensorFlow, PyTorch, Keras, Pandas, SciKit Learn, Matplotlib, Seaborn

Software Development Technologies: SQL, NoSQL

Big Data and Cloud Technologies: Microsoft Azure, Google Cloud

Computer Engineering: Data Structures, Algorithms, Object Oriented Programming

Projects

Deep Learning Specialization Projects

Generative Adversarial Networks for Realistic Image Synthesis

- Tackled challenge of generating realistic synthetic imagery without labeled datasets.
- Built and trained PyTorch GAN models to improve adversarial stability.
- Achieved visually consistent outputs and enhanced feature diversity across samples.

Convolutional Neural Networks for Object Detection and Image Generation

- Addressed limitations of traditional classifiers in handling image spatial hierarchies.
- Designed CNN architectures with transfer learning and residual blocks.
- Improved accuracy and generalization through YOLO-based detection.

Sequence Modeling with RNNs and Attention Mechanisms for Natural Language Processing

- Confronted with the difficulty of modeling sequential linguistic dependencies in text.
- Trained RNN, LSTM, and attention-based models for translation, sentiment, and trigger-word tasks.

Deep Learning Approaches for Emotion Recognition in Social Media Text

- Sought to detect emotional tone and polarity in informal, high-noise tweet data.
- Engineered tokenization and embedding layers with deep classifiers for multi-label emotion prediction.
- Produced robust classification results that outperformed classical sentiment baselines.

Optimization and Regularization Strategies for Neural Network Training

- Faced issues of slow convergence and overfitting in deep model training.
- Applied initialization schemes, dropout, L2 regularization, and batch normalization in TensorFlow.

Bias–Variance Trade-Off and Transfer Learning Strategies in Machine Learning

- Identified challenges of model under/overfitting and data mismatch in ML pipelines.
- Diagnosed errors and optimized architectures using transfer learning.

Implementation of Deep Neural Networks for Structured and Image Data

- building neural networks from scratch to understand backpropagation mechanics.

- Verified correctness through gradient checks.

MIT MicroMaster Projects

Q-Learning with Function Approximation for Sparse-Reward Text-Based Games(GitHub)

- Aimed to teach an agent to learn optimal policies under sparse reward conditions.
- Implemented Q-learning with linear approximation and adaptive exploration.
- Achieved stable convergence and measurable improvement in cumulative reward rates.

Progressive Digit Recognition on MNIST: From Linear Models to CNN

- Investigated performance limits of linear classifiers on handwritten digits.
- Constructed a pipeline from logistic regression to CNN architectures with dropout.
- Attained >98% accuracy while improving model robustness and computational efficiency.

Dimensionality Reduction and Classification of Single-Cell RNA-Seq Data (GitHub)

- Addressed the problem of analyzing noisy, high-dimensional genomic datasets.
- Applied PCA and t-SNE for dimensionality reduction and clustered cells.
- Discovered distinct cell types with cross-validation metrics.

Comparative Graph Analysis of Facebook and Twitter Networks Using Structural and Statistical Models (GitHub)

- Explored assortativity and topological differences between social networks.
- Computed degree distributions, centralities, and power-law fits to evaluate network models.

Graph-Based Centrality and Community Detection in Criminal and Citation Networks

- Tackled identification of key actors and clusters within complex networks.
- Applied centrality metrics and community detection algorithms on graph datasets.
- Revealed critical nodes and relationships informing intervention.

Collaborative Filtering with Gaussian Mixture Models for Sparse Movie Rating Prediction

- Confronted the problem of missing user ratings in recommendation systems.
- Modeled latent preferences using Gaussian mixture models with expectation-maximization.
- Improved prediction consistency and reduced BIC-based model penalty under sparse data.

Forecasting CO_2 Concentrations and Economic Indicators Using ARIMA Models (GitHub)

- Faced non-stationary patterns in environmental and economic time series.
- Built ARIMA models with residual diagnostics and forecast validation.

CPI and BER Inflation Data Analysis with External Regressors and Model Improvements (GitHub)

- Investigated relationship between CPI inflation and BER expectations for forecasting.
- Integrated external regressors into ARIMAX models and tested cross-correlation effects.
- Enhanced predictive accuracy and model stability across validation horizons.

Gaussian Process Models for Spatial Prediction of Environmental Data (GitHub)

- Aimed to predict spatial variables (such as ocean currents and temperature fields).
- Built Gaussian Process models with custom covariance kernels and interpolated flow patterns from Philippine Archipelago data.

TensorFlow Course Projects

Design and Optimization of Multilayer Feedforward Neural Architectures Using TensorFlow

Advanced Convolutional Frameworks for Image Recognition in TensorFlow

Leveraging Pretrained Deep Models for Domain-Specific Applications via Transfer Learning

Related Extra Courses

- **Machine Learning on Google Cloud**, Coursera 2020
- **Deep Learning Specialization**, Coursera (Offered by deeplearning.ai) 2020
- **Machine Learning, Coursera** (Stanford University) 2024

Related Attended Courses

Graduate Courses:
- Machine learning
- Data Mining & Knowledge Discovery
- Information & IT
- Web Architecture & Programming

Undergraduate Courses:
- Systems Analysis
- Computer Programming
- Engineering Statistics
- Computer Applications in IE

Awards

- Ranked **99th** among approximately 32,000 participants in the Information Technology Engineering National M.Sc. Entrance Examination for universities of Iran 2015
- Ranked among top **7%** among more than 260000 participants in the 'Iranian National universities' entrance exam for B.Sc. degree 2009
- Selected as a qualified person at the first stage of "Iranian National Computer Olympiad" 2006

Language Proficiency

English: Full professional proficiency: CELPIP–General LS: Listening 10/12, Speaking 7/12

Persian: Native or bilingual proficiency

REFERENCES

- **Dr. Seyed Kamal Chaharsooghi,** Professor at Tarbiat Modares University, Department of Industrial and Systems Engineering, Tehran, Iran.

  Email: skch@modares.ac.ir

- **Dr. Milad Jasemi,** Professor at University of Montevallo, Assistant Professor of Data Analytics/Department Chair

  Email: emjasemiz@montevallo.edu