Hamidreza Ghasemi Damavandi

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Personal Profile

An enthusiastic research data scientist with a Ph.D. in Electrical Engineering, skilled in diverse domains of artificial intelligence including Machine Learning, Deep Learning, Natural Language Processing, and Computer Vision. With over 7 years of experience in research and industry, I am dedicated to staying updated with the latest advancements and cutting-edge technologies in both data science and software engineering.

Professional Experience

- **Arizona State University** — Tempe, AZ
  Principal Data Scientist — *Dec 2020 - Current*
  - **Promotion**: Senior Data Scientist from December 2020 to October 2022, promoted to Principal Data Scientist on October 2022.
  - **Project**: Developed machine learning models to predict student persistence using various techniques such as XGBoost and Logistic Regression. Conducted model interpretability analysis using Shapley Additive exPlanations (SHAP) to enhance understanding of the models.
  - **MLOps**: Maintaining the full end-to-end production pipeline from model development to model deployment as well as the CI-CD pipeline using Metaflow, AWS SageMaker, Step Functions, Lambda, GitHub, Terraform, Jenkins with MLOps principals.
  - **Training Sessions**: Conducting training sessions for the team members to get familiar with the production pipeline.
- **Overstock** — Sandy, Utah
  Senior Machine Learning Scientist — *March 2020 - Dec 2020*
  - **Project**: Developed an optimization framework utilizing multi-variate constraint optimization techniques, specifically linear and integer programming, to determine the optimal allocation of discounts for on-sale items.
  - **Big Data Scenario**: Managed large-scale datasets consisting of millions of rows, executing queries, applying filters, and conducting data mining operations to identify correlations between fields, ultimately aiming to address specific business challenges. Additionally, developed robust, object-oriented Python scripts that adhered to high-quality coding standards. Employed Docker to containerize the scripts and utilized Apache Airflow to schedule their execution in production environments.
- **Arizona State University** — Tempe, AZ
  Postdoctoral Research Associate — *March 2018 - March 2020*
  - **Research Problem**: Created machine and deep learning architectures by leveraging scikit-learn and Keras packages to replicate conventional hydrological models.
  - **Proposal Writing**: Engaged proactively in both internal and external lab proposal writing sessions.
- **EmbodyVR** — Redwood City, CA
  Data Scientist — *August 2017 - November 2017*
  - **Project**: Contributed to the development of novel algorithms for personalizing head-related transfer function (HRTF) using a combination of traditional feature selection methods and machine learning models.
- **University of California - Los Angeles** — Los Angeles, CA
  Postdoctoral Scholar — *September 2016 - August 2017*
  - **Research Problem**: Developed machine learning algorithms to forecast the progress of patients with spinal cord injuries throughout the treatment phase.
  - **Statistical Analysis**: Utilized diverse statistical methods to extract valuable biological signals from clinical testings.

Education

- **University of Iowa** — Iowa City, Iowa
  PhD in Electrical Engineering; GPA: 3.89 — *Aug 2013 - Aug 2016*
- **University of Iowa** — Iowa City, Iowa
  Masters in Electrical Engineering; GPA: 3.89 — *Aug 2013 - July 2016*
- **University of Tehran** — Tehran, Iran
  Bachelors in Electrical Engineering; GPA: $\sim$ 3.31 — *Aug 2009 - July 2013*

Skills Summary

- **Mathematics**: Advanced mathematical & statistical skills.
- **Languages**: Python, MATLAB, R, C/C++, Java, SQL, Object-oriented Programming.
- **Tools**: Docker, PyTorch, TensorFlow, Keras, Metaflow, Jenkins, Spark, HPC Clusters, Amazon Web Services, Git, NLTK Package.
- **Soft Skills**: Critical Thinking, Problem-solving, Mentoring skills during Postdoc positions, Teamwork.

Research Interest

• Artificial Intelligence • Statistical Machine Learning • Scientific Machine Learning • Deep Learning • Natural Language Processing • Signal Processing • Image Processing • Optimization • Statistics

Selected Projects

- **Face Generation**: Built a deep convolutional GAN (generative adversarial network) to generate fake images from real celebrity images as part of the Udacity Deep Learning course. [code]
- **Sentiment Analysis**: Implemented text translation and sentiment analysis using Hugging Face transformers. [code]
- **SLAM**: Implemented Simultaneous Localization and Mapping (SLAM) technique as part of the Udacity Computer Vision course to track the location of a robot in a 2D world in real-time and identify the locations of landmarks such as buildings, trees, rocks. [code]
- **Image Captioning**: Trained a CNN-RNN model to predict captions for a given image as part of the Udacity Computer Vision course. [code]
- **Facial Keypoint Detection**: Trained a Convolutional Neural Network using PyTorch to detect facial keypoint (mouth, nose, eyes) in an image as part of the Udacity Computer Vision course. [code]
- **DNN Speech Recognizer**: Built a deep neural network using PyTorch that functions as an element of an end-to-end automatic speech recognition pipeline as part of the Udacity NLP course. [code]
- **Machine Translation**: Implemented an encoder-decoder network using Recurrent Neural Networks for translating English sentence to French sentence and vice versa as part of the Udacity NLP course. [code]
- **Part of Speech Tagging**: Built a hidden markov model for part of speech tagging as part of the Udacity NLP course. [code]
- **Landmark Classification and Tagging for Social Media**: Built a Deep Convolution Neural Network to classify different landmarks found on social media using PyTorch as part of the Udacity Deep Learning course. [code]

Honors and Awards

- Received Green Card through National Interest Waiver (NIW) due to exceptional abilities in the field of science.
- Ranked 5^{th} in the nation-wide Azad university entrance exam for Bachelor of Science, summer 2009.
- Ranked 236^{th} among 450000 in the nation-wide public university entrance exam for Bachelor of Science, summer 2009.
- Admitted to the University of Tehran, ranked 1^{st} school in Iran with a four-year scholarship, summer 2009.
- Served as a convener and chair in a session of Machine Learning applications of Hydrology, AGU 2019.
- Full Graduate Research Assistantship scholarship, University of Iowa, 2013.
- CGRER graduate travel award, university of Iowa, spring 2016.
- Authored & co-authored more than 20 publications (journal, conference and abstract) cited +100 times.
- Ranked 1^{st} at high school and pre-university program among all students.

Relevant Courses

• Machine Learning • Statistical Pattern Recognition • Optimization Techniques • Digital Signal Processing • Knowledge Discovery • Graph Algorithms & Combinatorial Optimization • Information Theory & Coding • Image & Video Compression • Stochastic Processes • Engineering Probability & Statistics • Signals & Systems • Engineering Mathematics

Teaching Experience

- Linear System I, University of Iowa, Spring 2015.
- Digital Signal Processing, University of Tehran, Fall 2012.
- Engineering Probability & Statistics, University of Tehran, Fall 2012.

Selected Certifications

- **Natural Language Processing**: Earned through Udacity learning portal. [link]
- **Computer Vision**: Earned through Udacity learning portal. [link]
- **Deep Learning**: Earned through Udacity learning portal. [link]
- **AWS Cloud Practitioner**: Earned through Amazon Web Services certification exam. [link]
- **AWS Machine Learning Speciality**: Earned through Amazon Web Services certification exam. [link]
- **Software Engineering Essentials**: Earned through Coursera Learning portal. [link]

Selected Publications

- **Using Satellite Remote Sensing and Machine Learning Techniques Towards Precipitation Prediction and Vegetation Classification [Journal of Environmental Informatics 2019 - Impact Factor: 10.22]**: Dimitrios Stampoulis Stampoulis, **Hamidreza Ghasemi Damavandi** , Dragan Boscovic, and John Sabo.
- **A Bayesian Neural Network for an Accurate Representation and Transformation of Runoff Dynamics: A Case Study of the Brazos River Basin in Texas. [Journal of Environmental Science and Engineering Technology 2020]** : **Hamidreza Ghasemi Damavandi**, Dimitrios Stampoulis, John Sabo1,Reepal Shah, Li Huang, Yuhang Wei, Yushiou Tsai, Jaishri Srinivasan, Tushar Sinha, Dragan Boscovic, and Glen Low.
- **Machine Learning Classifes Predictive Kinematic Features in a Mouse Model of Neurodegeneration[Scientific Reports 2021 - Impact Factor: 4.997]**: Ruyi Huang, Ali A. Nikooyan, Bo Xu, M. Selvan Joseph, **Hamidreza Ghasemi Damavand**, Nathan von Trotha, Lilian Li, Ashok Bhattarai, Deeba Zadeh, Yeji Seo, Xingquan Liu, Patrick A.Truong, Edward H. Koo, J. C. Leiter , Daniel C. Lu.
- **Real-time monitoring and prediction of water quality parameters and algae concentrations using microbial potentiometric sensor signals and machine learning tools[Science of The Total Environment 2021]**: Daniel Saboe, **Hamidreza Ghasemi Damavandi**, Ming Ming Gao, Mirjana Samardzic, Kiril D. Hristovski, Dragan Boscovic, Scott R. Burge, Russell G. Burge, David A. Hoffman.
- **An Active Learning Based Prediction of Epidural Stimulation Outcome in Spinal Cord Injury Patients Using Dynamic Sample weighting[ICHI 2017]**: Mohammad Kachuee, Lisa D. Moore, Tali Homsey, **Hamidreza Ghasemi Damavandi**, Babak Moatamed, Anahita Hosseini, Ruyi Huang, James Leiter, Daniel C. Lu, Majid Sarrafzadeh
- **Interpreting Comprehensive Two-dimensional Gas Chromatography Using Peak Topography Maps with Application to Petroleum Forensics[Chemistry Central Journal 2016]**: **Hamidreza Ghasemi Damavandi**, Ananya Sen Gupta, Robert K. Nelson, Christopher M. Reddy.