Maede Maftouni

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EDUCATION

Ph.D. in Industrial and Systems Engineering — May 2023
Virginia Tech, *Blacksburg, VA, USA*   GPA: 4/4

M.Sc. in Industrial and Systems Engineering — May 2020
Virginia Tech, *Blacksburg, VA, USA*   GPA: 3.97/4

M.Sc. in Industrial and Management Systems Engineering — May 2015
Amirkabir University of Technology (AUT), Tehran, Iran   GPA: 3.91/4

B.Sc. in Industrial and Management Systems Engineering — May 2013
Amirkabir University of Technology (AUT), Tehran, Iran   GPA: 3.82/4

SKILLS

- Data Science: Data Analytics, Machine Learning, Deep Learning, NLP, Computer Vision, Pattern Recognition.
- Programming: Python(Pandas, Scikit-learn, PyTorch, TensorFlow, etc.), SQL (Postgres), MATLAB, VBA.
- Tools & Technologies: Apache Airflow, AWS (EC2, Redshift, RDS, Aurora, S3, etc.), Apache Superset, Tableau, OpenCV, Docker, Kubernetes, Spark, Hadoop

SELECTED WORK EXPERIENCE

Senior Data Scientist, Quantum-Si — May 2022 – Present
- Developed a machine learning model to predict the laser power required for protein sequencing chips and implemented an Airflow pipeline for automated prediction generation and integration into a Superset dashboard.
- Created a Streamlit app focused on conducting detailed statistical comparisons among protein sequencing runs.
- Developed Airflow pipelines to automate the extraction and parsing of diverse data sources and crafted Superset dashboards to enhance operational efficiency and data transparency for R&D and marketing purposes.
- Adapted Airflow pipelines for compatibility with new cloud environments and customer tenants.
- Collaborated in the data analysis process to optimize kinetic databases, enhancing protein sequencing accuracy.
- Analyzed sequencing run data to identify patterns and root causes of data loss by developing a Python workflow that aggregates data across multiple runs and files for correlation analysis.
- Supported trace viewer development by equipping developers with in-depth knowledge of the cloud API and the relationships between traces and their metadata.
- Streamlined data operations by phasing out DBT, enhanced query performance, and optimized pipeline scheduling, aligned with management's strategy.
- Socialized Superset dashboard capabilities and availability of data tailored to users' analysis needs.

Adjunct Professor, University of New Haven — Sep 2023 – Present
- Delivered a comprehensive course on data engineering and science skills and tools, including workflow automation with Airflow, data manipulation with SQL, data wrangling and analysis in Python, dashboard creation in Tableau, and VBA programming in Excel.

Graduate Research Assistant, Virginia Tech — Sep 2018 – May 2023
- Worked on deep learning-based protein glycan interaction analysis.
- Implemented federated learning for the 3D printing process.
- Designed an attention-based deep learning model for parameter calibration of dynamical systems.
- Designed and implemented two robust COVID-19 CT scan classifiers on our own curated dataset.
- Designed and implemented a deep learning structure for laser melt pool video object segmentation.
- Implemented an online machine learning based control of smartphone battery recycling process.

Graduate Research Assistant, AmirKabir University of Technology — Sep 2014 – May 2015
- Designed and implemented a type-2 fuzzy expert system for osteomyelitis diagnosis.

Publications

- **Maede Maftouni**, Bo Shen, Andrew Chung Chee Law, N. Ayubi Yazdi, Zhenyu (James) Kong, ""A mask-guided attention deep learning model for COVID-19 diagnosis based on an integrated CT scan images database." IISE Transactions on Healthcare Systems Engineering 13.2, 2023.

- **Maede Maftouni**, Andrew Chung Chee Law, Bo Shen, Yangze Zhou, N. Ayubi Yazdi, Zhenyu (James) Kong, "A Robust Ensemble-Learning Model for COVID-19 Diagnosis on CT Scan Images," in IIE Annual Conference, 2021.

- Yingqi Lu, **Maede Maftouni**, Tairan Yang, Panni Zheng, David Young, Zhenyu (James) Kong, Zheng Li, "A novel disassembly process of end-of-life lithium-ion batteries enhanced by online sensing and machine learning techniques." Journal of intelligent manufacturing 34.5 2023.

- Liurui Li, **Maede Maftouni**, Zhenyu (James) Kong, Zheng Li, "An Automated Recycling Process of End-of-Life Lithium-Ion Batteries Enhanced by Online Sensing and Machine Learning Techniques," in REWAS, 2022.

- **Maede Maftouni**, M.H. Fazel Zarandi, I.B. Turksen, N. Ayubi Yazdi, "Systematic Bone Infection Detection in Axial Diabetic Foot MRI," in IEEE CIBCB, 2015.

- **Maede Maftouni**, M.H. Fazel Zarandi, I.B. Turksen, Faeze Roshani, "Type-2 Fuzzy Rule-Based Expert System for Ankylosing Spondylitis Diagnosis," NAFIPS, 2015.

- Faeze Roshani, M.H. Fazel Zarandi, I.B. Turksen, **Maede Maftouni**, "Fuzzy Expert System for Prognosis of Breast Cancer Recurrence," NAFIPS, 2015.

Awards and Achievements

- Won the **best paper competition** in the Manufacturing and Design Division of the IISE conference.   May 2022
- Won the **runner-up award** in INFORMS QSR **Data Challenge on COVID-19 CT Diagnosis**.   Nov 2020
- Won the **second place** in the 2020 VT INFORMS student chapter **Poster Competition**.   Nov 2020
- Awarded the **Graduate Fellowship** for the Ph.D. program at Virginia Tech.   Apr 2017
- Awarded the **honorary admission to M.Sc.** in Industrial Engineering at AUT.   June 2013

Professional Training and Certificates

- Graduate **Certificate in Data Analytics** at Virginia Tech.   May 2020
- One-year higher education course entitled **"Project Engineering"** at Tose'eh Institute.   Apr 2016
- Using Python to Access Web Data - University of Michigan at Coursera.org.   May 2016
- Machine Learning - Stanford University at Coursera.org.   Dec 2015

Teaching Experience

Workshops, Virginia Tech INFORMS Student Chapter   June 2021 – June 2022
- Deep Learning with Python.
- Building Interactive Dashboards with Tableau.
- US Real Estate Market Trends Visualization.
- Data Wrangling and Analysis in Python.

Instructor, Virginia Tech   May 2019 – July 2019
- Taught engineering economy undergraduate course.

Teaching Assistant, Virginia Tech   Sep 2018 – May 2021
- Probability Foundations (Spring 2021), Facilities and Logistics (Fall 2020), Production Planning and Inventory (Spring 2020), Management Systems (Fall 2019), Engineering Economy (Spring 2019), Operations Research (Fall 2018), Deterministic Operations Research (Spring 2018).

Leadership and Activities

- Served as **INFORMS student chapter vice president** at Virginia Tech.   Aug 2020 – May 2021
- Served as the ISE scientific association vice president at Amirkabir University of Technology.   Aug 2010 – May 2011