

Hojat Salehi

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Address: Miami, FL

Education

Florida International University

Aug 2023 - 2026

Ph.D., Computer Science (Reviewer **NeurIPS**, **ICML**, **ICLR**, **ITW**, **ISIT** and **T-IFS**). **Thesis:** A Stochastic Approach to Privacy-Preserving Distributed Parameter Estimation.

Sharif University of Technology

Sep 2010 - Sep 2012

MSc., Control Engineering. **Thesis:** A Fuzzy Probabilistic Belief Framework for Uncertainty Propagation in Dynamical System Reliability.

Tabriz University

Sep 2006 - Sep 2010

BSc., Control Engineering. **Thesis:** Quantitative Application of Non-Cooperative Game Theory Models for Stock Market Prediction.

Skills

• Analytical & Technical Skills:

- Machine Learning, Differential Privacy / Federated Learning, Graph Neural Networks, Graph Representation Learning, Explainable AI (XAI), Diffusion Models (DDPM/DDIM), Agentic AI / Multi-Agent Systems, LangGraph, Vector Databases (ChromaDB), Natural Language Processing, Optimization, Time Series Analysis, Data Science, Industrial Automation, SCADA.

• Programming Skills:

- Expert:** Python, PyTorch, Scikit-learn, Keras, TensorFlow, Pandas, NumPy.
- Proficient:** SQL, C/C++, Git, MySQL, PowerBI, TIA Portal, SIMULINK, LangGraph, ChromaDB, Hping3.

Experience

Graduate Research Assistant (Florida International University)

Aug 2023 - present

- **Maximally Negatively Correlated Quantizers in Distributed Learning (CorBin-FL)** [\[Paper\]](#) [\[Code\]](#)
 - Introduced correlated distributed quantization for federated learning, improving accuracy over [prior methods](#).
 - Validated on **CIFAR10**, **FEMNIST**, **Shakespeare**, and **Sent140** (CNN, ResNet18, LSTM, Transformer) on multiple **A100s**, achieving high communication efficiency by transmitting one bit per model weight.
- **Explanation-Preserving Augmentation for Semi-Supervised Graph Representation Learning** [\[Paper\]](#)
 - Developed a semantics-preserving graph augmentation technique leveraging GNN explainers, with theoretical analysis of its gains over prior methods.
 - Validated on MUTAG, Benzene, and PROTEINS, achieving up to **7.83%** improvement in classification accuracy.
- **Discrete Denoising Diffusion Model (DiGress) and Application in Graph Explainability**
 - Applied Discrete Denoising Diffusion ([DiGress](#)) to [ProxyExplainer](#) to improve GNN explainer accuracy.
 - Conditioned the diffusion model on explainer subgraphs to enable in-distribution graph generation, preserving explainable structure while reconstructing the rest.
- **Denoising Diffusion Implicit Model (DDIM) for Time Series Prediction** [\[Code\]](#)
 - Developed a conditional DDIM with an attention-based UNet for time-series analysis and generation.
 - Encoded volume and price movements as multi-channel RGB conditioning to capture temporal dependencies.
- **Agentic-SysID: Autonomous Multi-Agent System Identification** [\[Code\]](#)
 - Built a multi-agent pipeline (Intake, Modeler, Estimator, Validation) converting a natural-language plant description into a control-ready model with uncertainty bounds and a validity region, under a constrained budget.
 - Designed a physics-first fidelity ladder escalating from white-box to grey-box or black-box surrogate only on validation evidence, routed through a guarded, budget-enforced Plant API; demonstrated on a pendulum-with-friction plant that breaks the white-box model.
- **Multi-Agent Sports Game Analysis (LangGraph)** [\[Code\]](#)
 - Built a LangGraph-orchestrated multi-agent pipeline for NBA/MLB game analysis with parallel adversarial debates (win-probability, total-points), each converged by a judge and cross-validated by a head analyst.
 - Closed the loop with a post-game accuracy review that writes semantically-retrieved lessons to a ChromaDB memory store per agent role, across a mixed OpenAI/Anthropic LLM routing layer with SQLite persistence.

- **AI-driven stock market prediction**

- Web data extraction, feature selection, preprocessing (FFT, LOWESS), and LSTM-based stock-market prediction.

Senior Electrical Engineer (Tunnel Sadd Ariana)

Sep 2019 - Jun 2022

- **Managed the implementation of industrial automation**

- Implemented PLC programming and designed SCADA for irrigation-system water-flow control and monitoring.

- **Supervised electrical and industrial-automation section of two comprehensive World Bank projects.**

Research Fellow (K.N. Toosi University)

Sep 2013 - Mar 2019

- **Researched gradient-based optimization methods**

[\[Paper\]](#)

- Applied a second-order gradient-based technique to solve optimal control problems in hybrid dynamical systems.

- **Developed advanced control strategies for bipedal and monopod robots**

- Extended the hybrid minimum principle (HMP) to control a monopod robot for maximum jumping height.

Projects**eBay ML Challenge: NLP-Driven Auto Part Classification**

May 2024 - Dec 2024

- **NLP for information extraction:** Combined Named Entity Recognition and inference-based methods to pair vehicle components from free-text descriptions.
- **Data preprocessing:** Cleaned and filtered text, applied spaCy-based importance summarization, and built augmented, auto-labeled training sets.
- **Two-stage BERT fine-tuning:** One model extracts initial labels directly; a second infers missing fields from context, improving accuracy and recall.

Detection of DDoS Attacks using SVM and Logistic Regression

Jan 2023 - Sep 2023

- Built an SVM/Logistic-Regression DDoS classifier on the CIC-DDoS2019 dataset (SMOTE-balanced) and on self-generated traffic captured via hping3/Wireshark.
- Achieved high accuracy and low false-positive rates across both datasets, showing real-world applicability. [\[Code\]](#)

A Genetic Algorithm and Tabu Search Method for Supply Chain Problems

Mar 2019 - Sep 2019

- Developed a Genetic Algorithm and Tabu Search for capacity-constrained location-routing, overcoming exact-method computational limits for large-scale Mixed Integer Programming (MIP) in supply-chain problems; presented at the 2nd International Congress on Engineering Technology and Innovation.

Publications (Scholar [\[link\]](#))**Accepted**

- **Hojat Allah Salehi**, Farhad Shirani, "On Non-Interactive Simulation of Distributed Sources with Finite Alphabets", *IEEE Transactions on Information Theory*, 2025. [\[Link\]](#)
- **Hojat Allah Salehi**, Farhad Shirani, and S. Sandeep Pradhan. "Quantum Advantage in Non-Interactive Source Simulation." *IEEE International Symposium on Information Theory, ISIT 2025*. [\[Link\]](#)
- Chen, Zhuomin, J. Ni, **Hojat Allah Salehi**, Xu Zheng, E. Schafr, F. Shirani, and Dongsheng Luo. "Explanation-Preserving Augmentation for Semi-Supervised Graph Representation Learning." *AAAI 2026*. [\[Link\]](#)
- Zhuomin Chen, **Hojat Allah Salehi**, Esteban Schafr, Xu Zheng, Jiaying Zhang, Hua Wei, Jingchao Ni, Farhad Shirani, and Dongsheng Luo. "Addressing Structural Distribution Shift in Explanations for Graph Neural Networks." *IEEE Transactions on Pattern Analysis and Machine Intelligence, TPAMI 2026*. [\[Link\]](#)
- **Hojat Allah Salehi** and Babak Tavassoli, "A Gradient Algorithm for Solution of the Optimal Control Problem for Hybrid Switching Systems," *Journal of Optimal Control Applications and Methods*, Vol. 41, Issue 6, pp. 1854-1874, 2020. [\[Link\]](#)
- **Hojat Allah Salehi** and Babak Tavassoli, "Iterative calculation of optimal control trajectories for nonlinear systems," *IEEE 5th International Conference on Control, Instrumentation, and Automation (ICCIA)*, pp. 365-370, 2017. [\[Link\]](#)
- Babak Tavassoli and **Hojat Allah Salehi**, "An efficient method for solution of the linear hybrid optimal control problem," *IEEE 5th International Conference on Control, Instrumentation, and Automation (ICCIA)*, pp. 359-364, 2017. [\[Link\]](#)

Under Review and Preprints

- **Hojat Allah Salehi**, Md Jueal Mia, S. Sandeep Pradhan, Farhad Shirani, M. Hadi Amini, "CorBin-FL: A Differentially Private Federated Learning Mechanism using Common Randomness", *under review, Springer Nature Machine Learning*. [\[Link\]](#) [\[Code\]](#)
- Zhuomin Chen, Jingchao Ni, **Hojat Allah Salehi**, Xu Zheng, Dongsheng Luo, "From Binary to Continuous: Stochastic Re-Weighting for Robust Graph Explanation", *under review, NeurIPS 2026*.
- Schafr, Esteban, Xu Zheng, **Hojat Allah Salehi**, Zhuomin Chen, Mo Sha, Wei Cheng, and Dongsheng Luo. "DecoSearch: Complexity-Aware Routing and Plan-Level Repair for Text-to-SQL." arXiv:2606.17821 (2026).
- Xu Zheng, Zhuomin Chen, Esteban Schafr, Sipeng Chen, **Hojat Allah Salehi**, Haifeng Chen, Farhad Shirani, Wei Cheng, Dongsheng Luo, "LM²otifs: An Explainable Framework for Text Authorship Detection", *under review, NeurIPS 2026*.