Pegah Mansourian

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SUMMARY OF QUALIFICATIONS

- Machine learning researcher specializing in deep learning, time-series modeling, anomaly detection, and adversarial robustness for safety-critical systems.
- Experienced in designing, implementing, and evaluating transformer-based model on large-scale datasets.
- Hands-on development in Python using TensorFlow/Keras and PyTorch, with reproducible experimentation workflows (Git, Jupyter) and familiarity with scalable ML pipelines on AWS.
- Strong technical communicator with peer-reviewed publications, conference presentations, and paper reviewing experience.

Research Experiences

University of Windsor
Ph.D. Researcher **Sep 2021 – Nov 2025**
Artificial Intelligence Empowered Intrusion Detection Systems for Vehicular Networks, supervised by Dr. Ning Zhang

- Conducted research on ML-based anomaly detection and adversarial robustness in connected vehicular networks (CAN bus and VANET).
- Developed lightweight time-series anomaly detection models (LSTM and ConvLSTM) for CAN bus intrusion detection, achieving >99% detection performance across diverse attack scenarios.
- Optimized CAN bus IDS models for real-time deployment under latency and compute constraints, achieving 0.06 ms inference per message and demonstrating feasibility for embedded automotive environments.
- Proposed a Transformer-based anomaly detection architecture for VANET traffic, modeling temporal dependencies and cross-vehicle interactions in heterogeneous, multi-source data streams.
- Designed and modified multi-head attention mechanisms, introducing source-conditioned attention and enforced head diversity to enhance representation robustness and generalization, achieving >98% detection performance and outperforming multiple baseline methods.
- Developed a constrained adversarial perturbation validation framework for IDS models operating under physically bounded feature spaces, preventing unrealistic robustness evaluations and improving detection under attack by up to 17% while reducing adversarial success rates by 83%.
- Contributed to model design, implementation, large-scale experimentation, and technical documentation within a 6-member research team.
- Authored peer-reviewed publications in top-tier venues, including a Best Paper Award–winning conference paper.

Amirkabir University of Technology
MSc. Researcher **Sep 2017 – Feb 2020**
Anomaly Detection in Internet of Things: Fog and Cloud Hierarchical Approach, supervised by Dr. Mehdi Dehghan

- Investigated machine learning methods to capture spatiotemporal correlations in IoT multivariate time-series data for anomaly detection.
- Implemented a hierarchical, scalable edge deployment using ConvLSTM, distributing inference across edge nodes to support low-latency detection.
- Improved system-level efficiency by reducing response time and minimizing exposure of raw data through on-device/edge processing, supporting stronger privacy posture.

Work Experiences

Huawei Technologies Services
Transmission Solution Manager **Sep 2020 – Aug 2021**

- Designed optical transmission network solutions by translating requirements into technical architectures and implementation plans.
- Partnered with delivery, product management, and engineering teams to align technical scope, risks, and deliverables.
- Supported proposals and bids with clear technical documentation and solution trade-offs.

Hamrah-e-Avval (MCI)
Software Test Engineer **Sep 2016 – Dec 2017**

- Created test plans and test cases to validate software against requirements, focusing on reliability and edge cases.
- Performed backend validation and root-cause analysis using SQL, collaborating with developers in a C++ codebase and supporting automated testing workflows.
- Logged and triaged defects with reproducible steps and clear documentation to accelerate debugging and release quality.

Certifications and Skills

Machine Learning: TensorFlow, Keras, PyTorch, scikit-learn, NumPy
Generative AI: LLMs, transformers, RAG
Programming: Python, MATLAB
Research: Technical writing, paper reviewing
Cloud: AWS Certified Cloud Practitioner

Volunteering

Chair, IEEE Young Professionals – Windsor section **March 2022 – Dec 2024**

- Led a 5-member team to support early-career engineers transitioning from student to professional life.
- Organized and hosted technical workshops, webinars, and professional events.
- Built collaboration opportunities by networking with IEEE sections worldwide and industry partners.

Publications

- *P. Mansourian, N. Zhang, M. Mirhassani, and T. Allsopp, "**VANformer: an Informer-based Framework with Vehicle-Aware Attention for Anomaly Detection in Vehicular Networks**," Manuscript submitted to IEEE Trans. Intell. Transp. Syst., November 2025.*
- P. Mansourian, N. Zhang, A. Jaekel and T. Allsopp, "**Enhancing Machine Learning-based IDS for Vehicular Networks by Addressing Adversarial Attacks**," IEEE Trans. Veh. Technol., 2025.
- P. Mansourian, N. Zhang, A. Jaekel, M. Zamanirafe, and M. Kneppers, "**Anomaly detection for connected autonomous vehicles using LSTM and Gaussian Naive Bayes,"** in Proc. 13th EAI Int. Conf., WiSATS 2022, Singapore, Springer, 2023 *(Best Paper Award)*.
- P. Mansourian, N. Zhang, A. Jaekel and M. Kneppers, "**Deep Learning-Based Anomaly Detection for Connected Autonomous Vehicles Using Spatiotemporal Information,**" IEEE Trans. Intell. Transp. Syst., 2023.
- J. Nagarajan, P. Mansourian, M. S. Anwar, A. Jaekel, I. Saini, N. Zhang, M. Kneppers, "**Machine Learning based intrusion detection systems for connected autonomous vehicles: A survey,**" Peer-to-Peer Netw. Appl., 2023.
- M. Zamanirafe, P. Mansourian, N. Zhang, "**Blockchain and Machine Learning in Internet of Vehicles: Applications, Challenges, and Opportunities**" IEEE Internet Things Mag., 2023.