Hossein Rouzbahani

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Profile Summary

As a Ph.D. in Electrical and Computer Engineering with a solid background in Data Science, I have proposed and developed two novel data-driven reinforcement learning algorithms for the first time to optimize scheduling and routing processes in IoT-driven networks. As a result, I achieved a 24% reduction in power loss and a monthly decrease of 3.91 kg in greenhouse gas emissions in smart buildings. I have also conceptualized and implemented a multi-layer cyber defense mechanism utilizing cutting-edge techniques such as deep snapshot neural networks, and autoencoder. This mechanism can detect both known and novel cyber threats with high precision, as demonstrated by a detection rate of 98.02%. My innovative algorithms were developed through a comprehensive and multidisciplinary approach that combined advanced techniques in quantitative and qualitative data analytics, machine learning, and deep domain knowledge in Electrical and Computer Engineering. This approach ensured that my algorithms are not only effective and efficient but also applicable to a wide range of real-world scenarios in IoT-driven networks.

My key strengths and core competencies can be categorized as follows:

- **Data-driven proficiencies:** Quantitative and qualitative analyses, Business intelligence, Data mining and data modeling, Data visualization

- **Engineering proficiencies:** Demand Side Management (DSM), Electricity market, Internet of Energy (IoE), Smart Grids Analysis, Security of Cyber-Physical Systems

- **Programming and Computer competencies:** Python, Java, MATLAB, Flutter (Dart), AWS-Machine Learning, AWS-Data Analytics, Simulink, Power BI, SQL, Microsoft (MS) Visual Studio, MS Office Suite

- **Machine Learning expertise:** Supervised, Unsupervised, and Reinforcement Learning, Deep Learning, Ensemble Learning, Federated Learning, Natural Language Processing (NLP)

- **Management aptitudes:** Project management, Risk management, Waterfall and Agile development methodologies

Professional Experience

Smart Cyber-Physical System (SCPS) Lab, Canada   Sep 2021 – Dec 2022
Senior Researcher and Data Scientist

- Designed and deployed a real-time industrial condition monitoring system to collect, preprocess, and analyze extensive sensor data sets from rotary equipment in the oil and gas industry. Key system parameters, such as events history, plant status, asset monitoring, and security alerts were shared through an interactive dashboard that was created to support effective decision-making.

- Implemented predictive fault and anomaly analysis using Supervised and Unsupervised Learning algorithms, to proactively identify potential equipment failures, minimizing maintenance expenditures and improving system reliability.

- Collaborated with a diverse team of engineers and Postdoctoral Fellows to establish a project plan and generate technical and non-technical reports outlining the project's timelines, resources, deliverables, and budgetary constraints.

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New Gold Inc., Canada   Sep 2020 – Jul 2021
Project Engineer

- Designed and developed a Cyber-Attack detection layer, utilizing a simulated deep Q-Learning-based intelligent attacker to ensure the data accuracy and integrity of the mill expert system.
- Developed a highly efficient Deep Neural Network-based algorithm for fault prediction, resulting in a 9% improvement in the fault forecast rate. This led to a significant reduction in costs, allowing for a more streamlined maintenance strategy and improving overall plant performance
- Conducted comprehensive training sessions for the engineering team to enable them to customize the developed algorithms to cater to changes in the plant's operational environment. This includes adjustments due to the integration of new equipment, unit additions, changes in processes, and data collection rates, among other potential modifications.

Jabeja Inc. (Startup Company), Iran   Feb 2017 – Apr 2019
Project Engineer

- As part of the Startup team, led the engineering team in the development and implementation of advanced technology solutions to provide transportation and ride-hailing.
- Worked closely with the management and other departments to ensure that the technology aligned with the overall business strategy and goals, administering over 30,000 trip requests per day with about 300,000 active users in one year since launch.
- Selected and synthesized information from a broad range of sources including the Ministry of Transportation, and municipalities, conducted market research and analyses to understand existing services, guidelines, and regulations, to determine major strengths and weaknesses for different services to support data-based decisions.
- Built and maintained an excellent rapport with management, colleagues, and business partners.

Education

Ph.D., Electrical and Computer Engineering   Sep 2019 – Dec 2022
- **University of Calgary**

Master of Science, Power Engineering, Energy Management   Sep 2014 – Oct 2016
- **Hamedan University of Technology, Iran**

Bachelor of Engineering, Electrical Engineering   Sep 2006 – Sep 2011
- **Bu Ali Sina University, Iran**

Publications

- Number of Journal/Conference papers: 16
- Number of Citations (as of February 2023): 248, h-index = 8, i10-index = 8
- For more detail please visit: https://scholar.google.com/citations?user=3FsbadcAAAAJ&hl=en