Pedram Agand

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Summary

With a PhD in computer science specializing in AI for sequential modeling and decision making, I have 5+ years of industrial experience deploying enterprise-scale AI solutions that drive business impact. My expertise includes developing scalable cloud architectures and distributed microservices with a focus on leveraging LLM-based technologies. I am skilled in collaborating cross-functionally to build data-driven solutions that enhance user engagement and customer satisfaction.

Education

Ph.D. Computer science @ SFU (GPA: 4.08/4.33) [M. Chen, E. Park]   **Burnaby, Canada**
Sequential Modeling, Generative AI (LLM), Computer vision, Offline RL, Autonomous driving.

M.Sc. Computer science @ SFU (GPA: 4.13/4.33) [M. Chen, A. Lim]   **Burnaby, Canada**
Thesis: From Estimation to Control for Robotic Navigation: Probabilistic ...

M.Sc. Electrical eng. @ K. N. Tossi (GPA: 3.91/4) [H. Taghirad, A. Sedigh]   **Tehran, Iran**
Thesis: Control architecture based on environment impedance in Teleoperated ...

B.Sc. Electrical eng. @ K. N. Tossi (GPA: 3.89/4) [H. Taghirad]   **Tehran, Iran**
Thesis: Implementation and control of Minimally Invasion Eye Surgery Robots ...

Professional experience

SDE/Applied Scientist @ DaTu - SFU education [Manager: Dr. Tenzin Doleck]   *May 2022- now*
- Explanatory data analysis, Streamlit (scalable deployment), recommendation system in AI-tutor (GitHub).
- Train BERT for score prediction with contrastive learning, enhancing accuracy by 25% (GitHub).
- AI-assisted recommendations that instruct users according to their interaction logs with Local LLM (Llama 3), a vector DB of rules, and LangGraph. The deployed microservice FastAPI improves users' scores by 31%.

Scholar/Machine Learning Engineer @ BCAHL VCH [Manager: Wes Regan]   *Apri- July 2024*
- Fine-tuned self-corrective RAG agent using Phi3, QLoRA, and Langgraph to extract information from meeting notes/transcripts, reducing staff data collection time by an average of 6 hours weekly. (GitHub)

Research Assistance @ NRC - SFU joint project [Supervisor: Allison Kennedy]   *Sep 2021-2024*
- Implemented ETL pipelines to analyse 2 years of ferry operational data with DNN and ensembles (GitHub).
- Model Based Offline RL to optimizing navigational practice, scheduling and fuel consumption (GitHub).
- Led and mentored two USRA students and one intern in prototyping DL models for industry-scale data, resulting in two published research papers. Effectively communicated results to non-technical stakeholders.

Machine Learning Researcher @ Borealis AI [Manager: Keyi Tang]   *Sep-Dec 2022*
- Research: Estimating density ratio via attention-based network and propensity score estimator in finance.
- Engineering: Pipeline, CI/CD, Nvidia cluster, Foundation models, ML flow, Slurm, CR/PR, Unit test.

Machine Learning Researcher @ Breeze traffic [Manager: Alexey Iskrov]   *Apr-Aug 2021*
- Developing reward shaping deep RL framework for traffic signal control to reduce CO2 (GitHub).

Research Assistance @ Huawei - SFU joint project [Supervisor: Dr. Zhan Xu]   *Jan-Nov 2020*
- Human navigational intent prediction using probabilistic and optimal approaches (GitHub).

Data Scientist @ FHP [Manager: Amir Ghaffari]   *Sep 2017-2019*
- Developed ML solutions for smart home to guide technicians using customers data with Pyspark.
- Designed and implemented a robust data pipeline for real-time sensory input access, deploying predictive models in Azure using Docker containers, ensuring scalability and reliability in production environments.

Technical skills

- **Scientific Computing:** Pytorch, TensorFlow, Wandb, MATLAB, Jupyter, PySpark, Scikit-learn.
- **LLM:** Ollama, Langchain(Graph), OpenAI API, FlanT5, Bert, (Q)Lora, Chromadb, HNSW, NER.
- **Software Development:** Python, C&C++, Azure cloud (Functions, Cosmos DB, Data Factory).
- **Other:** ADSL, SQL, Linux, Bash, Docker, GitHub, CUDA, A/B test, LaTeX.

Recent publications   [See full list]

Distilled Multi-Task Learning for Transformer-Based Sensor Fusion   *IROS 2024*
Pedram Agand, Mohammad Mahdavian, Manolis Savva, and Mo. Chen
DMFuser uses multiple RGB-D for semantic segmentation and depth perception to generate end-to-end navigational commands with an attention-CNN and hybrid control in Carla (Github).

DMODE: Differential Monocular Object Distance Estimation   *RoMoCo 2024*
Pedram Agand, Michael Chang, and Mo. Chen
Estimating object's distance by alternation in object's size over time via a single camera and IMU.

Sequential Modeling of Complex Marine Navigation: Case Study on a Passenger Vessel
Yimeng Fan*, Pedram Agand* , Mo Chen, Edward J Park, Allison Kennedy and Chanwoo Bae   **AAAI 2024**
Transformer-based forecasting model with Gym simulator and D4RL-compatible dataset (Github).

Fuel Consumption Prediction for a Ferry using ML and in-service Data   *Ocean Eng. 2023*
Pedram Agand, Allison Kennedy, Trevor Harris, Chanwoo Bae, Mo Chen, and Edward J. Park
Comparison of (non)parametric ML models (e.g. XGboost) to predict fuel consumption (Github).

DRL Traffic Signal Controls with Optimized CO2 emissions   *IROS 2023*
Pedram Agand, Alexey Iskrov, and Mo Chen
Prioritize road users based on their fuel efficiency to enhance overall travel time and CO2 emission.

Online Probabilistic Model Identification using Adaptive Recursive MCMC   *IJCNN 2023*
Pedram Agand, Mo Chen, and Hamid D. Taghirad
Variable jump policy with temporal forgetting factor to estimate pdf in hybrid models.

Human Navigational Intent Inference with Probabilistic and Optimal Approaches
Pedram Agand, Mahdi Taher Ahmadi, Angelica Lim, and Mo Chen   **ICRA 2022**
Noisily rational model of human behaviour with recursively and continuously update via Bayesian.

Highlighted projects

Model-based Offline RL with Uncertainty Aware Actor Critics   (*submitted*) ICRA 2025
Penalize reward based on OOD (using VAE) and model sensitivity of the simulated environment to augment pseudo samples in a decoupled, penalized TD3+BC reinforcement learning agent.

LeTFuser for Autonomous Driving with Multi-Task Learning   *CVPR-VCAD 2023*
Design Imitation learning method with Light-weight End-to-end Transformer-Based model for real-time autonomous driving, boosting driving score by 35% under adversarial conditions.

EcoLight: Reward Shaping in DRL for Environment Friendly Traffic Control   *NeurIPS-w 2021*
Adjust various RL methods based on the road users to reduce overall CO2 emissions and travel time.

Honors and awards

- **CS Research Day Award:** Third place in the poster presentation for DMODE paper   2022
- **Graduate Fellowship:** Full scholarship for 6 years from SFU applied science   2019-2025
- **Entrance scholarship:** 10,000 CAD from graduate dean SFU   2019
- **Elite foundation of Iran membership:** Privilege for exceptional talented graduate students   2017
- **Best researcher award:** From university dean among M.Sc. degree students.   2017
- **Best paper Award:** For oral presentation particle filters paper   2016