Nima Sarang

nimasarang@gmail.com | nimasarang.com | nima-sarang | nsarang | Canada

Experience

Senior Machine Learning Scientist 05/2022 – Present
Expedia Group *Vancouver, BC*

- Tech Lead for $500M search ads bidding system, optimizing 100M+ daily auctions across SEM and Metasearch channels
- Own technical strategy and architecture decisions for team of 7 ML scientists and engineers. Mentor team members, define research priorities, review all designs and code, maintain production systems
- Built our ML infrastructure, which includes data pipelines, model training/inference, orchestration, CI/CD, monitoring, offline evaluation. Maintain monorepo of in-house bidding algorithms and partner algo adaptors (tROAS, tCPA)
- Developed auction optimization algorithms, forecasting and elasticity models, pacing and capital allocation tools using deep learning, RL, online learning, and GBTs
- Delivered annualized 28% profit lift and 25% booking lift through 18 A/B test wins
- Solved data sparsity with hierarchical modeling and evaluation across advertiser segments and bid landscapes
- Designed real-time bid controllers using control theory to steer algorithm behavior toward business targets

Technical Consultant & Instructor 09/2021 – 03/2022
Ericsson ML/AI Upskill Training Program, Concordia University *Montreal, QC*

- Instructed PyTorch and Computer Vision tutorials for enterprise ML training program
- Mentored 3 teams through project implementation and debugging phases

Machine Learning Engineer 07/2019 – 06/2020
Divar (40M+ users) *Tehran, IR*

- Developed real-time pose estimation model for automatic license plate detection and privacy protection
- Built used-car price valuation model deployed as SaaS, with analytical tools using Apache Spark
- Created on-device multi-task AI model for real-time image classification and price estimation using TensorFlow Lite and Android deployment
- Implemented hybrid recommender system for product sales and automated content moderation using PyTorch
- Applied fastText and TF-IDF for automatic data labeling and classification tasks

Research Assistant 11/2017 – 09/2018
Computational Biology Research Center, Amirkabir University *Tehran, IR*

- Designed protein sequences for targeted tertiary structures using AI and evolutionary profiles

Technical Skills

Machine Learning & AI: PyTorch, TensorFlow 2, Scikit-learn, XGBoost, OpenCV, Deep Learning, Computer Vision, NLP, Reinforcement Learning
Programming Languages: Python, C++, SQL, JavaScript
Data & Analytics: Pandas, Apache Spark, NumPy, Matplotlib, Plotly, Dash, Streamlit
Development Tools: Git, Docker, Jupyter, VS Code, DVC, Pytest, Linux, AWS
Specializations: Online Learning, Real-time Systems, A/B Testing, Statistical Modeling, Algorithm Design

Projects

Technical Blog & Knowledge Sharing | *nimasarang.com* 2024 – Present

- Published guides on custom loss functions for GBT frameworks, post-mortem debugging, information theory, and running LLMs locally in browser using WebGPU
- Implemented gradient boosted trees (LightGBM, CatBoost) and multi-layer LSTM with AdamW optimizer from scratch in NumPy to deeply understand internals

Open Source Development | *Python Packages & OSS Contributions* 2020 – Present

- Contributed to PyTorch Lightning, Pandas, PyTorch Forecasting, and Keras LR Finder
- Published 3 pip-installable packages: FrameDisplay (Jupyter DataFrame enhancement), Pymortem (debugging tool), Custodium (investment portfolio tracking)

Tractable Deep Reinforcement Learning | *PyTorch, Computer Vision, RL* 09/2020 – 04/2022

- Master's thesis: Developed automatic extraction system for urban road networks from aerial imagery
- Applied deep reinforcement learning to solve massive-scale environments in collaboration with CAE

Stock Price Forecasting with Transformers | *PyTorch, Time Series, Deep Learning* 11/2020 – 04/2021

- Enhanced Google's Temporal Fusion Transformer (TFT) architecture for financial prediction
- Applied Soft-DTW loss function on engineered price data features for improved forecasting accuracy

Augmented Reality Soccer Game | *Unity, Computer Vision, Deep Learning* 10/2018 – 06/2019

- Bachelor's thesis: Two-player AR soccer game with virtual ball and field using real-time object tracking
- Implemented optimized semantic segmentation model and custom object tracking algorithms

Education

Concordia University Montreal, QC

Master of Science in Computer Science, GPA: 4.0/4.0 *08/2020 – 04/2022*

- Visiting Student at McGill University (Fall 2020)

Amirkabir University of Technology Tehran, IR

Bachelor of Science in Computer Science *09/2015 – 06/2019*

- Graduated 3rd in class, Dean's Honour List
- Thesis: Augmented Reality Soccer Using Deep Learning

Publications

Nima Sarang and Charalambos Poullis. "Tractable large-scale deep reinforcement learning." *Computer Vision and Image Understanding*, vol. 232, 103689, 2023.

Fatemeh Zare-Mirakabad, Marzieh Movahedi, **Nima Sarang**, and Shahriar Arab. "Protein design using native secondary sub-structures and solvent accessibility." *7th Iranian Conference on Bioinformatics*, 2018.

Achievements & Recognition

Competitions: 5th Place DrivenData Water Supply Forecast (2024), 2nd Place CleanMalta AI Hackathon (2021), 2nd Place AUT ACM-ICPC (2016)
Academic: Engineering Graduate Scholarship Concordia (2021), Merit Scholarship Concordia (2020)
Competitive Programming: ACM-ICPC team member at Amirkabir University (2016-2017), algorithmic problem solving in graph theory, dynamic programming, computational geometry
Teaching: TA for AI, Computer Vision, Machine Learning (Concordia), Algorithms, Data Structures, Graph Theory (Amirkabir)