# NIMA SARANG

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## WORK EXPERIENCE

**Machine Learning Scientist III** May 2022 - Present
*Expedia Group* Vancouver, BC

- Applied Researcher in Search Engine Marketing (SEM)
- Responsible for developing automated SEM CPC bidding algorithms on Bing and Google using online learning, statistics, probabilities, machine learning, deep learning, and common sense.
- Developed bidding algorithms that led to 15 A/B test wins, with technical leadership in 8 of the tests. These algorithms resulted in a significant lift in profit (31%) and bookings (37%).
- Design and manage end-to-end data pipelines for data ingestion, preprocessing, model training, and bid submission; implement offline evaluation systems to assess bid quality and algorithm effectiveness.
- Worked on **capital allocation**, **sparsity-aware ML** models, **textual analysis**, and **real-time controllers**.

**Technical Consultant** Sep 2021 - Mar 2022
*Ericsson ML/AI Upskill Training Program, Concordia Univ.* Montreal, QC

- Instructed **PyTorch** and **Computer Vision** tutorials
- Provided advice and assistance to teams in implementation and debugging

**Machine Learning Researcher** Sep 2020 - Apr 2022
*Immersive & Creative Technologies Lab, Concordia Univ.* Montreal, QC

- Leveraged **deep reinforcement learning** to solve massive-scale environments and developed an automatic extraction system for urban road networks from high-resolution aerial imagery

**Machine Learning Engineer** July 2019 – June 2020
*Divar* Tehran, IR

- Divar is a classified ads service with 40+ million users
- Developed a real-time **pose estimation model** for automatically hiding vehicle license plates in images, and published an educational technical blog on the implementation details.
- Developed a used-car **price valuation model** that was deployed as a free SaaS to users. Built analytical tools for price trends using Spark.
- Self-taught PyTorch to develop an automated bot for removing prohibited image content.
- Designed a hybrid **recommender system** for product sales
- Developed a **on-device multi-task AI model** for image classification and price estimation of merchandise and commodities in real-time. Deployed on Android using Java and TensorFlow Lite. Used fastText and TF-IDF to automatically tag unlabeled data

## EDUCATION

**Concordia University** 2020 – 2022
*M.Sc. in Computer Science* Montreal, QC

- **Visiting Student**, McGill University, Fall 2020
- **GPA:** 4.0/4.0

**Amirkabir University of Technology** 2015 – 2019
*B.Sc. in Computer Science* Tehran, IR

- Dean's Honour List

## PUBLICATIONS

### Journal Articles

- **N. Sarang** and C. Poullis, "Tractable large-scale deep reinforcement learning," *Computer Vision and Image Understanding*, vol. 232, p. 103 689, 2023.

### Conference Proceedings

- F. Zare-Mirakabad, M. Movahedi, **N. Sarang**, and S. Arab, "Protein design using native secondary sub-structures and solvent accessibility.," in *7th Iranian Conference on Bioinformatics*, 2018.

## OSS CONTRIBUTIONS

Contributed to PyTorch Lightning, Pandas, PyTorch Forecasting, Keras LR Finder, and other open-source projects through bug fixes and documentation improvements.

## HONOURS & AWARDS

- **5th Place, DrivenData** 2024
  Water Supply Forecast Rodeo
- **2nd Place, Team Presagis** 2021
  CleanMalta AI Computer Vision Hackathon
- **Engineering and Computer Science Graduate Scholarship**
  Concordia University 2021
- **Merit Scholarship**
  Concordia University 2020
- **Graduated 3rd in Class**
  Amirkabir University 2019
- **2nd Place, AUT ACM-ICPC**
  Amirkabir University 2016

**Research Assistant** Nov 2017 - Sep 2018

*Computational Biology Research Center, Amirkabir Univ.* Tehran, IR

- Worked on designing protein sequences that can fold into a given tertiary structure using AI and evolutionary profiles

## TEACHING EXPERIENCE

**Teaching Assistant** 2021 – 2022

*Concordia University* Montreal, Canada

- Computer Vision
- Machine Learning
- Artificial Intelligence

**Teaching Assistant** 2017 – 2019

*Amirkabir University of Technology* Tehran, IR

- Design and Analysis of Algorithms (x2)
- Theory of Computation
- Introduction to Programming
- Graph Theory
- Data Structures and Algorithms

## NOTABLE PROJECTS

**Stock Price Forecasting with Transformers** Nov 2020

Tweaked Google's TFT architecture and applied it on a set of engineered features from price data, with Soft-DTW as the loss function

**Augmented Reality Soccer Using Deep Learning**

*Bachelor's Thesis* Oct 2018 - June 2019

- Developed a two-player soccer where the game is played with a virtual ball and field.
- Built using Unity, an optimized semantic segmentation model, and an object tracking algorithm

**Image Denoising Autoencoder** May 2018

Implemented a CNN-based autoencoder to denoise corrupted images, using Berkeley's BSDS500 dataset.

**Fully-Dynamic Graph Connectivity** Mar 2017

Used Euler-tour trees to implement Holm's dynamic connectivity algorithm, achieving amortized operation costs of $O(\log^2 n)$.

## SKILLS

**Machine Learning / Deep Learning**
Image Segmentation, Object Detection, Generative Models, Regression Models, Reinforcement Learning

**ML Toolbox**
PyTorch, TensorFlow 2, OpenCV, Pandas, Scikit-learn, Xgboost, fasttext, Apache Spark

**Visualization**
Plotly, Dash, Streamlit, Matplotlib, D3.js

**Development Tools**
Jupyter, VS Code, Git, DVC, Pytest

**Programming Languages**
Python, C++

## PERSONAL DEVELOPMENT

### Workshops and Seminars

- **Introduction to Cognitive Neuroscience**
  IPM, Tehran, Feb 2018
- **International Computational Biology Workshop**
  AUT, Tehran, Dec 2017

### Online Courses

- Practical Deep Learning For Coders (fastai)
- Deep Learning Fundamentals (CognitiveClass.ai)
- Convolutional Neural Networks for Visual Recognition (Stanford CS231n)
- Biology Meets Programming: Bioinformatics for Beginners (UC San Diego)