Trevor Olsen

Sr Data Scientist

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Summary: Double Ph.D. in Computer Science and Mathematics with 3 years of experience in the finance industry developing machine learning models and data-pipelines to operate at scale. In my current role I am focused on improving price predictions and ranking comparable sales for homes across the United States. I have an extensive background in academia, which includes coursework in machine learning, deep learning, statistics, linear algebra and graph theory as well as 7 publications in the fields of robotics, discrete mathematics and statistics.

WORK HISTORY

- **Senior Data Scientist,** Freddie Mac **08/2022 - Present**
  - **House Price Prediction Model Enhancement:**
    - Created a house price prediction deep learning model which covers 100 million properties in the US. Provided a 2% accuracy boost compared to production in pre-defined testing regions
    - Implemented a constant time geospatial lookup algorithm to enable enhanced data engineering
    - Developed a pipeline that unified 5+ vendor data sources, improving data coverage and runtime
  - **Comparable Sales Model:**
    - Proposed and constructed tree-based appraiser adjustment models which are within 5% of the actual appraiser adjustment in 99% of the validation set
    - Initiated and built a comparable sales recommendation system to generate a ranking of the best comparable sales for new construction homes. This doubled the coverage on new construction homes with an identical performance to production model
  - **Team Leadership and Collaboration:**
    - Planned and organized the 2024 Q3 hackathon to enrich the geospatial data for production models. New features provided a 1-2% boost in production price prediction models over initial testing regions
    - Was selected as an officer to oversee the comparable sales model initiative
    - Won the 2023 Q1 Hackathon which involved matching school boundaries to US properties by developing the algorithm that had the best coverage and fastest runtime
    - Developed automation scripts to assist new hires through the onboarding process
- **Lecturer**, University of South Carolina **08/2016 - 12/2021**
  - Taught 18 courses including: statistics, linear algebra, multivariate calculus and advanced algorithms
  - Earned an average student evaluation of 4.75/5
- **Adjunct Faculty**, Miami Dade College **05/2015 - 08/2016**
  - Instructed a wide range of classes including: statistics, calculus and financial mathematics
  - Average student evaluation of 4.9/5

EDUCATION

- **Ph.D. in Computer Science**, University of South Carolina **01/2022**
  - Developed more than 5 sampling methods which reduced the runtime by 90% when compared to the best know algorithm and solved novel problems in the robotics pursuit-evasion domain. This code was implemented in C++ with additional Python and Shell scripts to automate over 5000 simulations. This resulted in 3 publications with 2 additional papers in preparation
- **Ph.D. in Mathematics**, University of South Carolina **05/2020**
  - Analyzed over a billion graph isomorphism classes and generalized structures by density-based invariants. Code was written in Python (SageMath) and resulted in 3 publications with 2 more in preparation

- **M.A. in Mathematics**, University of Miami **05/2015**
- **B.S. in Computer Science and Math**, Palm Beach Atlantic University **05/2013**
- **Coursework:** Machine Learning, Deep Learning, Advanced Statistics and Probability, Regression Analysis, Robotics, Parallel Computing, Image Processing, Linear Algebra, Graph Theory, Advanced Algorithms

COMPETENCIES

- **Programming Experience** – Python (PyTorch, Scikit-learn, Tensorflow, Pandas, Numpy, Jupyter, NetworkX), SQL, C++, R
- **Theory** – Deep Learning, Machine Learning, Large Language Models (LLM), Natural Language Processing (NLP), Graph Neural Networks, Statistics, Robotics, Linear Algebra
- **Personal Interests** – Video/board games, foster failure dog dad, hiking, college football, woodworking

SELECTED PUBLICATIONS & PERSONAL PROJECTS

- **Robust-by-Design Plans for Multi-Robot Pursuit-Evasion**
  - Utilized intelligent sampling method and an enhanced DFS to effectively create a plan to pursue and evader, regardless of robotic failures
  - International Conference on Robotics and Automation (2022)
- **Minimum Wiener Index of Triangulations and Quadrangulations**
  - Found the structure which minimizes the Wiener Index on maximally planar graphs and a closed formula for this index as a function of the number of vertices, results were proven to be optimal
  - Discrete Applied Mathematics (2022)
- **Clinical Characteristics of Suspected COVID-19 in Pediatric Patients**
  - Conducted statistical analysis on study comparing positive and negative COVID-19 patients
  - International Journal of Critical Care and Emergency Medicine (2021)
- **NCAA March Madness Bracket Predictor**
  - Assembled 20 years of data with web scraping before pre-processing
  - Predicted the correct winner with 75% accuracy using predictive models
  - Utilized a Bayesian optimizer to tune the hyper-parameters