Amir Sadeghi

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Education

PhD in Physics, *University of Waterloo*, ON, Canada 2018 - 2024

Experience

Postdoctoral Researcher and Lecturer Jun 2024 - Now
Department of Physics and Astronomy @ University of Waterloo Waterloo, ON, Canada

- Modeled the interplay between crowding and transertion in bacterial chromosome organization.
- Conducted cluster analysis and autocorrelation tests on 400k+ particles using in-house algorithms, SciPy, and statsmodels.
- Developed and maintained a scientific Python package for streamlining research data management and analytics.

PhD Research Assistant May 2018 - Apr 2024
Department of Physics and Astronomy @ University of Waterloo Waterloo, ON, Canada

- Studied the role of crowding, transcription, cross-linking, and confinement in bacterial chromosome organization.
- Performed 5000+ molecular dynamics simulations via LAMMPS on the SLURM scheduler.
- Combined 70+ TB of data into MB-sized databases via PostgreSQL and pandas, reducing query and analysis times by 10x.
- Developed efficient algorithms for calculating volume distributions of 300k+ particles across various coordinate systems.

Data Scientist Jul 2020 & Jul 2021
Wolfram Research Remote

- Attended the Wolfram Data Science Boot Camp in 2020, evaluating classification algorithms in Mathematica.
- Trained a supervised classifier on 4000+ materials, achieving 80%+ accuracy in predicting electronic conductivity.
- Used dimensionality reduction techniques and ensemble methods, improving model performance by 15%.
- Admitted to the Wolfram Summer School in 2021, creating a global database of university course listings.
- Used graph analysis to course listings, quantifying curriculum integration and coherence for UWaterloo and MIT.
- Engineered an unsupervised classifier with the Levenshtein metric, identifying course topic overlaps with 85%+ accuracy.

MSc Research Assistant Aug 2014 - Aug 2016
Department of Physics @ Institute for Advanced Studies in Basic Sciences (IASBS) Zanjan, Iran

- Researched the buckling of a floating viscous layer under compression using dimensional analysis.
- Analyzed images with OpenCV in C++, detecting oil-water boundary changes 10x faster than Fiji and MATLAB.

Projects

AICurriNet (Startup Idea accepted at Venture for Canada) May 2023 - Present

- Processed data from 10+ university course listings, building a vector database with Pinecone for curriculum mapping.
- Used PyTorch, Hugging Face, and LangChain to integrate GNNs and LLMs, creating a curriculum generation system.

Skills

Data Analytics Experimental Design, Exploratory Data Analysis, Hypothesis Testing (e.g., A/B test), Dimensionality Reduction, Statistical Sampling and Bootstrapping, Bayesian Data Analysis, Monte Carlo Simulations, Time Series Analysis (e.g., GARCH).

Data Visualization Matplotlib, Seaborn, Bokeh, Dash, Plotly, Project Jupyter, Mathematica.

Data Engineering Database Design, Database Management Systems (PostgreSQL, MySQL, MongoDB), Databricks, Spark, dbt.

Programming and Software Development Python, C/C++, Shell Scripting, Git/GitHub, Docker, Kubernetes, Wolfram Language.

ML, AI, and Cloud Tools TensorFlow, PyTorch, Scikit-learn, HuggingFace, LangChain, OpenAI API, MLflow, NannyML, AWS, Azure.

Certifications

Machine Learning Scientist, *DataCamp* 2024
Asso. AI Engineer for Data Scientists, *DataCamp* 2024
Data Scientist, *DataCamp* 2024
Data Analyst, *DataCamp* 2024
Machine Learning Engineer, *DataCamp* 2024
Asso. AI Engineer for Developers, *DataCamp* 2024
Professional Data Engineer, *DataCamp* 2024