Alfredo González-Espinoza, PhD

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Summary

Data Scientist with a research background in Chemistry, Physics and Data Science. Demonstrated expertise in solving complex interdisciplinary problems and delivering innovative solutions. Passionate about data-oriented research and data-driven product development that contribute to generating a positive impact in society by solving real world problems.

Strengths & Skills

Creative thinker driven by intellectual curiosity and the excitement of exploring new challenges. Highly motivated to learn new skills and topics, and focused on continuous growth. Exceptional project management abilities and effective communication skills across diverse teams. Proficient in translating technical concepts into actionable insights for both technical and non-technical audiences. Inclusive and collaborative team player, attentive listener who values feedback, reflection, and self awareness.

Methodological expertise:

Complex Systems, Time Series Analysis, Stochastic Simulations, Network/Graph Theory, Information Theory, Hypothesis Testing, Machine Learning, Statistical Inference, Natural Language Processing.

Technical Skills:

Languages: Julia, Python (Pandas, Numpy, Matplotlib, PySpark, Keras, TensorFlow, PyTorch, Scikit-learn, NLTK, spaCy, scipy, Flask). Other: R (familiar), Linux, Bash, LaTeX, Git, SQL, Jupyter notebook, Pluto notebook, MLOps (CI/CD).

Work Experience

Postdoctoral Researcher, University of Pennsylvania, PA, USA. 2019 - 2022

I led a research project in the mathematical biology group, focusing on quantifying the evolution of musical features and innovation in musical scores. Relevant work included: Data collection, cleaning and processing from diverse sources and in variable formats. I developed mathematical and probabilistic models, implemented computational algorithms and experiments for hypothesis testing. I also built and maintained data infrastructure and git repositories, develop quantitative research methods to analyze results. I wrote software documentation and research manuscripts for publication. Results featured in the prestigious journal Scientific American.

Postdoctoral Researcher, National Institute of Genomic Medicine, México. 2018 - 2019

Developed the methodology and analysis to quantify different types of malignancy in breast cancer, and contributed to potential treatments. Relevant work included: collaborating with an interdisciplinary team on projects, developing a novel machine learning algorithm to identify communities of statistically dependent genes. I performed advanced statistical analysis and quantifies genomic features using information measures. I mentored PhD students in their research projects, present results weekly to PI and managers. Wrote software documentation and research manuscript for publication.

Other Experience/Projects

I have a large array of diverse projects I have pursued in academic and non-academic environments. Most projects are data-oriented. A sample of these are listed here:

- Analyzed high-resolution spatio-temporal tracking data for a professional soccer team in Mexico
- Built and analyzed knowledge graphs of news articles using NLP and semantic graph techniques
- Developed an LSTM model for sentiment analysis of tweets in Spanish
- VADER sentiment analysis and topic modeling to characterize pop music

Education

2014 - 2018 PhD in Science (Physics) **Universidad Autónoma del Estado de Morelos, México**
Graduated with honors
2011 - 2014 Master of Science (Physics) **Universidad Autónoma del Estado de Morelos**
2005 - 2011 Bachelor of Science (Chemistry) **Universidad Autónoma del Estado de Morelos**

Awards & Selected Publications

National scholarship for graduate studies (PhD) fully funded by CoNaCyT
National scholarship for graduate studies (Master degree) fully funded by CoNaCyT
Alfredo González-Espinoza, Gustavo Martínez-Mekler, and Lucas Lacasa. (2020) Arrow of time across five centuries of classical music. *Phys. Rev. Research*, 2:033166.

Interests & Activities

Amateur cellist/musician, Photography, Soccer, Videogames, Continuos learning, Science Communication, Neuroscience, Urban planning