OSCAR ALEJANDRO GOMEZ QUINTERO

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Education

New York University Abu Dhabi **Aug 2016 - May 2020**
B.S. Mathematics, B.S. Computer Science - GPA: 3.89/4.00 (Cum Laude) *Abu Dhabi, UAE*
Relevant Coursework: *Machine Learning, Algorithmic Foundations of Data Science, Artificial Intelligence, Database Systems, Visual Analytics, Advanced Probability, Mathematical Statistics, Privacy and Fairness in Data Science*

Skills

Python (Pandas, Scikit-learn, Pytorch, Keras, Tensorflow, Scipy, Numpy, Matplotlib, Seaborn, Plotly, Bokeh, Flask), **JavaScript**, **SQL**, **R** (Shiny), C, C++, Java, Mathematica, Spark, Git, Bash, Linux, LaTeX. **English (Bilingual), Spanish**.

Work Experience

Research Assistant **Aug 2021 - Present**
Databases Group at Duke University Department of Computer Science *Durham, NC, USA*

- Researching explanation methods for data-driven systems using causal inference. Developed an interactive webapp for data analysts to perform hypothetical What-If and How-To analysis in relational data with an extension of SQL.
- Teaching Assistant for the course *Mathematical Foundations of Computer Science*. Completed graduate coursework in Artificial Intelligence, Database Systems, and Privacy and Fairness in Data Science, regularly presenting research papers.

Data Scientist **Aug 2020 - June 2021**
Quantil S.A.S. *Bogota, Colombia*

- Developed an end-to-end machine learning solution to predict credit risk for a company focused on the distribution of cycling products, successfully detecting more than 90% of the largest delayed payments and overall ROC-AUC of .79.
- Analyzed the dynamic spatio-temporal behavior of homicide data in Bogota using Zero-Inflated Embedding models [3].
- Studied the effect of compliance with quarantines and lockdowns on domestic violence during the Covid-19 pandemic in Bogota using mobility data and Generalized Additive Models (GAMs).
- Developed interpretation methods for Conditional Generative Adversarial Networks (cGAN) to predict robberies using SHAP values. Implemented the calibration of the network for fairness using kernel mean embeddings [2].
- Collaborated within diverse teams of mathematicians, economists, engineers, and scientists. Regularly gathered and presented results through client meetings, progress reports, and 3 academic research publications.

Data Science Intern **June 2019 - Aug 2019**
Nexquare *Dubai, UAE*

- Enhanced machine learning models predicting student performance and employability, by developing and incorporating an interpretability and visualization module within the analytics platform, collaborating with teams across Dubai and India.
- Integrated the Python and R back-end for the platform, allowing seamless use of models developed in both languages.

Machine Learning Intern **June 2018 - Aug 2018**
Visualization and Data Analytics Lab at NYU Tandon School of Engineering *New York City, NY, USA*

- Trained SVMs, Random Forests, and Neural Networks to predict customer credit risk from a FICO home credit dataset.
- Developed visual and interactive explanations for the models based on feature importance and counterfactuals. Our solution [5] earned 2nd place in the **FICO Explainable ML Challenge**. We generalized it for tabular data in the papers [1] and [4].

Machine Learning Research Assistant **Feb 2017 - May 2018**
Music and Sound Cultures Group at NYU Abu Dhabi *Abu Dhabi, UAE*

- Led the analysis for the NYUAD library collection of more than 10,000 Arab and African records, using computational audio analysis, machine learning, and visualization techniques.
- Developed an interactive webapp to explore musical similarity using k-means clustering, deep autoencoders, and t-SNE [6].

Projects and Publications

1. ***AdViCE*: Aggregated Visual Counterfactual Explanations for Machine Learning Model Validation.** IEEE Visualization Conference (VIS 2021).
2. **Interpreting a Conditional Generative Adversarial Network Model for Crime Prediction.** Iberoamerican Congress on Pattern Recognition (CIARP 2021).
3. **Zero-Inflated Embeddings to Analyze Homicide Occurrence Patterns.** International Conference on Computing and Data Science (CDS 2021).
4. ***ViCE*: Visual Counterfactual Explanations for Machine Learning Models.** ACM Conference on Intelligent User Interfaces (IUI 2020).
5. **FICO Explainable Machine Learning Challenge:** Webapp with global and local explanations for machine learning models predicting customer credit risk. Tech: Python, JavaScript, D3.js, Flask, scikit-learn.

Honors and Awards

Full Scholarship: New York University Abu Dhabi 2016 - 2020
2nd Place Winner: NYUAD International Hackathon Apr 2020
2nd Place Winner: FICO Explainable Machine Learning Challenge Jan 2019
Best Admission Score (Nationally): Universidad Nacional de Colombia Apr 2016
Honorable Mention/Bronze/Silver: International/Iberoamerican/Centroamerican Math Olympiads 2014 - 2016

Leadership / hobbies: NYUAD Mathematics Club President, Tennis, Basketball, Biking, Guitar, Bass, Drums.