Oscar Alejandro Gomez Quintero

oscargomezq.github.io
github.com/oscargomezq

+971 543042253
oscar.gomez@nyu.edu
linkedin.com/in/oscar-gomezq

Education

- **New York University Abu Dhabi** — Abu Dhabi, UAE
  B.S. Mathematics, Computer Science (Cum Laude) - GPA: 3.89/4.00 — *Aug 2016 - May 2020*
  Semester Abroad: *NYU Courant Institute of Mathematical Sciences, New York*
  Coursework: *Machine Learning, Algorithmic Foundations of Data Science, Visual Analytics, Probability and Statistics, Advanced Probability, Mathematical Statistics, Software Engineering, Computational Social Science, Operating Systems*

Publications

- ***ViCE*: Visual Counterfactual Explanations for Machine Learning Models.** **Oscar Gomez**, Steffen Holter, Jun Yuan and Enrico Bertini. ACM Conference on Intelligent User Interfaces (IUI 2020).
- **Exploring Music Collections: An Interactive, Dimensionality Reduction Approach to Visualizing Songbanks.** **Oscar Gomez**, Kaustuv Kanti Ganguli, Leonid Kuzmenko and Carlos Guedes. ACM Conference on Intelligent User Interfaces (IUI 2020). Demo paper.
- **Mapping the Sounds of the Swahili coast and the Arab Mashriq: Music research at the intersection of computational analysis and cultural heritage preservation.** Konstantinos Trochidis, Beth Russell, Andrew Eisenberg, **Oscar Gomez**, Kaustuv Kanti Ganguli, Carlos Guedes, Virginia Danielson and Christos Plachouras. 6th International Conference on Digital Libraries for Musicology (DLfM 2019). Poster paper.

Work and Research Experience

- **Junior Researcher** — Bogota, Colombia
  Quantil | Matematicas Aplicadas — *Aug 2020 - Present*
  - Research in the area of Data Mining for the development of analytical models from crime in Bogota.
  - Researched and implemented zero-inflated embedding models for homicide data.
- **Capstone Project in Mathematics** — Abu Dhabi, UAE
  Mathematics Department at NYU Abu Dhabi - Advisor: Alberto Gandolfi — *Sept 2019 - July 2020*
  - Proposed and studied a generalization of the Potts model with a penalty term on the number of colors in configurations.
  - Devised and implemented Markov-Chain Monte Carlo simulations by generalizing the Swendsen-Wang algorithm.
  - Analyzed the model's properties analytically, proving its infinite phase transitions using the theory of random partitions.
- **Data Science Intern** — Dubai, UAE
  nexquare — *June 2019 - Aug 2019*
  - Developed and incorporated an interpretability module for machine learning models processing over 800 million data points across more than 220 schools in over 10 countries.
  - Developed model agnostic interpretability algorithms (local feature importance and counterfactual explanations).
  - Integrated the Python and R back-end for the analytics app, allowing seamless use of models developed in both languages.
- **Machine Learning Explainability and Visualization Research Intern** — New York, USA
  Visualization and Data Analytics Lab at NYU Tandon - Advisor: Enrico Bertini — *June 2018 - Aug 2018*
  - Trained SVMs, Random Forests, and Neural Networks to predict customer credit risk from a FICO home credit dataset.
  - Generated instance explanations for the models based on feature importance and counterfactuals.
  - Developed global explanations as interactive visualizations of clusters of individual instances.
- **Machine Learning for Musical Analysis Research Assistant** — Abu Dhabi, UAE
  Music and Sound Cultures Group at NYU Abu Dhabi - Advisor: Carlos Guedes — *Feb 2017 - May 2018*
  - Led the computational analysis for an Arab/African music collection with more than 10,000 songs.
  - Performed dimensionality reduction with deep autoencoders on the spectrogram of the audio and the extracted MFCCs.
  - Developed an interactive webapp to explore musical similarity by using k-means clustering and t-SNE embedding, and provided insight to create a Virtual Reality rendering of the similarity space.

Selected Projects

- **FICO Explainable Machine Learning Challenge:** Webapp with global and local explanations for machine learning models predicting customer credit risk. Tech: Python, JS, D3, Flask, Sklearn.
- ***ViCE* (Open source Python library):** Computations and interactive visualizations of counterfactual explanations for machine learning models. Tech: Python, JS, D3, Flask, Sklearn.
- **TaskJam:** App to motivate and connect people in lockdown with similar tasks during the COVID pandemic. Tech: Python, Flask, MongoDB.
- **Can success in International Science Olympiads predict future scientific impact?:** Computational Social Science final project. Scraped and analyzed data from five international olympiads. Tech: Pandas, BeautifulSoup, Bokeh, Seaborn.

Skills

- **Languages:** Python, R, JavaScript, C, C++, Java, Mathematica, SQL
- **Libraries/Tools:** SciPy, NumPy, Pandas, Sklearn, Keras, Spark, D3, Bokeh, Tableau, Flask, RShiny, Git, Bash, Linux, LaTeX

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*
- **Honorable Mention:** Al-Khwarizmi International Mathematical Competition *Oct 2018*
- **Best Admission Score (Nationally):** Universidad Nacional de Colombia *Apr 2016*
- **Honorable Mention/Bronze/Silver:** International/Iberoamerican/Centroamerican Math Olympiads *2014-2016*

Leadership

- **President, NYU Abu Dhabi Mathematics Club** Abu Dhabi, UAE
  Led weekly training sessions. Coordinated events and guest talks with the department. *Jan 2017 - Dec 2018*