**OSCAR ALEJANDRO GOMEZ QUINTERO**

+971 (0)54 304 2253 | oscar.gomez@nyu.edu | [oscargomezq.github.io](https://oscargomezq.github.io/)

|  |  |  |
| --- | --- | --- |
|  | **EDUCATION** |  |

**B.S. Mathematics, B.S. Computer Science** GPA: 3.89 / 4.00

New York University Abu Dhabi, *Abu Dhabi, UAE* Aug 2016 –May 2020

NYU Courant Institute of Mathematical Sciences, *New York, USA*Feb 2019 –May 2019

**Research Interests:** interpretable and interactive machine learning, fairness, visualization, human-computer interaction

|  |  |  |
| --- | --- | --- |
|  | **PUBLICATIONS** |  |

1. **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).*
2. **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.
3. **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.

|  |  |  |
| --- | --- | --- |
|  | **RESEARCH EXPERIENCE** |  |

**Research in Machine Learning Explainability and Visualization** Aug 2019 – Present

Visualization and Data Analytics Lab at NYU, *New York, USA*  June 2018 – Aug 2018

Supervised by Dr. Enrico Bertini

* Developed machine learning models to predict customer credit risk from a FICO line of credit dataset.
* Generated instance explanations for the best performing model by implementing algorithms to detect the most important features and the minimal set of changes needed to alter the model’s output.
* Developed global explanations in the form of interactive visualizations to explore the individual explanations through a hierarchical organization that groups similar instances.
* Presented the project (second place in the FICO Explainable Machine Learning challenge) at the 2019 DARPA Explainable Artificial Intelligence (XAI) PI Meeting.
* Expanded the project by developing *ViCE*, a tool that generates and provides an interactive visual interface for counterfactual explanations [1].

**Capstone Project in Mathematics** Sept 2019 – Present

Mathematics Department at NYU Abu Dhabi, *Abu Dhabi, UAE*

Supervised by Dr. Alberto Gandolfi

* Researched applications of the Random Cluster Model for geometric fitting and hypergraph clustering.
* Studied methods for simulating Ising, Potts, and Random Cluster models such as Glauber dynamics and the Swendsen-Wang algorithm.
* Analyzed, through the theory of Markov chains, the conditions for convergence to a stable distribution for the algorithm proposed in “The random cluster model for robust geometric fitting”. Pham, T. et. al. (2014).

**Research in Machine Learning for Musical Analysis** Sept 2019 – Present

Music and Sound Cultures Group at NYU Abu Dhabi, *Abu Dhabi, UAE* Feb 2017 – May 2018

Supervised by Dr. Carlos Guedes

* Developed and implemented the computational analysis of two non-western music collections for the project “Computationally-Engaged Approaches to Rhythm and Musical Heritage” [3].
* Performed musical feature extraction and conducted an exploratory analysis of the data by using dimensionality reduction with deep autoencoders.
* Developed an interactive visualization depicting the musical similarity of the data by using k-means clustering and t-SNE embedding, where users can listen to the clips and explore artists clustered together [2].

|  |  |  |
| --- | --- | --- |
|  | **WORK EXPERIENCE** |  |

**Data Science Intern**June 2019 – Aug 2019

nexquare, *Dubai, UAE*

* Enhanced machine learning models, used to predict student performance and employability, that process 800 million data points across more than 220 schools in over 10 countries.
* Developed an interpretable machine learning module that provides students, educators, regulators, and ministers explanations for the models’ decisions.
* Implemented model agnostic interpretability algorithms (local feature importance and counterfactual explanations) and incorporated them within the company’s advanced analytics platform.

|  |  |  |
| --- | --- | --- |
|  | **LEADERSHIP** |  |

**President, NYUAD Mathematics Club** Sept 2019 – Present

New York University Abu Dhabi*, Abu Dhabi, UAE* Jan 2017 – Dec 2018

* Programmed activities for high school students and guest speaker talks for university students.
* Prepared the syllabus and led the weekly training sessions in preparation for international competitions.
* Coordinated and supervised NYUAD’s team participation in the International Mathematics Competition of 2018 and the Al-Khwarizmi International Mathematical Competition of 2018.

|  |  |  |
| --- | --- | --- |
|  | **AWARDS** |  |

* **Second Place**, FICO Explainable Machine Learning ChallengeJan 2019
* **Honorable Mention**, Al-Khwarizmi International Mathematical Competition Oct 2018
* **Honorable Mention**, International Mathematical Olympiad (IMO) July 2016
* **Bronze Medal**, Iberoamerican Mathematical Olympiad Sept 2014
* **Silver Medal**, Centroamerican and Caribbean Mathematical Olympiad June 2014

|  |  |  |
| --- | --- | --- |
|  | **SKILLS** |  |

* **Programming**: Python, R, JavaScript, C, C++, HTML, CSS, Git
* **Data Science / Visualization:**  scikit-learn, Keras, SQL, D3.js, Bokeh, Plotly, Tableau, LaTeX
* **Languages:** Spanish (Native), English (Fluent), French (Basic)
* **Relevant Coursework:** Fairness, Introduction to Machine Learning, Algorithmic Foundations of Data Science, Visual Analytics, Probability and Statistics, Advanced Probability, Software Engineering, Mathematical Statistics and Machine Learning, Computational Social Science