

# JOSEPH MARTINEZ

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## SUMMARY

Research Assistant with **3 years of experience** in Machine Learning, and Natural Language Processing. Proficient in training **LLMs**, Machine Learning algorithms, and building Simulation models. Strong communication skills through professional engagements. Proven ability in programming and large-scale data analytics to derive **valuable insights**. Collaborative team member with a track record of **successful collaboration** on international research projects.

## SKILLS

<b>NLP:</b> scikit-learn, Transformers, spaCy, Hugging Face, OpenAI GPT-4	<b>Deep Learning:</b> Pytorch, Keras, ANN
<b>Machine Learning:</b> Classification, Regression, Clustering, PCA, NumPy	<b>Data Analysis:</b> Python, Pandas, R, SQL
<b>Data Visualization:</b> Tableau, Power BI, R Shiny	<b>DevOps:</b> Git, GitHub, Docker

## WORK & RESEARCH EXPERIENCE

### Aaru, Inc

*AI Software Developer*

New York City, NY

July 2024 – Present

- Improved the performance of multi-agent Large Language Model systems by designing and implementing advanced algorithms for task coordination, communication efficiency, and decision-making in complex Agent-Based Simulation environments.
- Designed simulation environments integrating survey and historical data to model political and business scenarios, enabling the generation of actionable insights and predictive analytics.
- Conducted innovative research in machine learning and Natural Language Processing while collaborating with interdisciplinary teams to develop innovative AI-driven solutions for real-world challenges.

### Virginia Modeling, Analysis, & Simulation Center (VMASC)

*Graduate Research Assistant*

Suffolk, VA

Sep 2022 – Present

- Trained the Large Language Model (LLM) GPT-3.5's to create ABM Simulation models, by improving its ability to generate NetLogo interface and procedural code elements through few-shot prompting.
- Developed a conversational Chatbot expert in a custom domain enhancing answer fidelity by 90% by fine-tuning the LLM Llama2 7B on a dataset of 330 news articles.
- Trained and fine-tuned Machine Learning classification models (RFC, ANN, and BERT) to identify types of frustration in textual data, achieving an average accuracy of 70%.
- Designed and maintained detailed documentation of models, algorithms, and reports on GitHub repositories.
- Presented poster at a research conference in Pittsburgh, and attended others in Arlington, VA, and Oxford, OH.

### University of Agder (UiA)

*Exchange Researcher*

Kristiansand, Norway

Oct 2024 – Nov 2024

- Conducted a joint research project with historians and AI researchers to analyze historical and cultural components of Norwegian identity in the public sphere.
- Utilized NER and LLMs to extract and analyze historical references from Norwegian newspapers, identifying patterns in cultural representation and omissions.

### Old Dominion University

*Social Media Data Analyst (Consultant)*

Norfolk, VA

Jul 2021 – Jan 2022

- Geolocated, filtered, and estimated the tone of **7.3 million Tweets** through fine-tuning fifteen NLP models (spaCy, BERT, RoBERTa) and Statistical Analysis. Models were highly reliable, with a mean accuracy of 72%.
- Extracted, cleaned, and pre-processed **15.5 million Tweets** in multiple languages with Twitter's API and Python.
- Collaborated with teams from Norway, Colombia, Greece, and USA on a \$1.4M USD Minerva research initiative.

### Universidad del Norte

*Social Media Data Analyst (Research Assistant)*

Barranquilla, Colombia

Nov 2020 – Jun 2021

- Trained a Natural Language Understanding (NLU) model with IBM Watson to semi-automate the identification of actors, factors, and relationships from news articles, achieving a final accuracy of 70%.
- Gathered, filtered, and cleaned geo-tagged 4,680 Tweets on migration using Twitter's API and Python.
- Conducted a lexicon-based Sentiment Analysis of Tweets to spot xenophobic trends.

## EDUCATION

<b>Old Dominion University</b>	Norfolk, VA
M.Sc. Modeling and Simulation Engineering - GPA: 3.7	Aug 2022 – Dec 2024
<b>Correlation One</b>	New York, NY
Data Science for All (Bootcamp)	Mar 2022 – Jul 2022
<b>Universidad del Norte</b>	Barranquilla, Colombia
B.Sc. Industrial Engineering - GPA: 3.6	Jan 2017 – Mar 2022

## PUBLICATIONS

- **Joseph Martínez**, Brian Llinas, Jhon G. Botello, Jose J. Padilla, and Erika Frydenlund. “Enhancing GPT-3.5’s Proficiency in NetLogo through Few-Shot Prompting and Retrieval-Augmented Generation” 2024 Winter Simulation Conference (WSC) IEEE (2024).
- Erika Frydenlund, **Joseph Martínez**, Jose J. Padilla, Katherine Palacio, and David Shuttleworth. “Modeler in a Box: How Can Large Language Models Aid in the Simulation Modeling Process?” SIMULATION (2024).
- Lynch, Christopher J., Erik J. Jensen, Madison H. Munro, Virginia Zamponi, **Joseph Martínez**, Kevin O'Brien, Brandon Feldhaus, Katherine Smith, Ann Marie Reinhold, and Ross Gore. “GPT-4 Generated Narratives of Life Events using a Structured Narrative Prompt: A Validation Study.” (2024)
- **Joseph Martínez**, Melissa Miller-Felton, Jose J. Padilla, Erika Frydenlund. “Behind Derogatory Terming for Venezuelan Migrants in Colombia: Xenophobia and Sexism Identification with Twitter Data and NLP” (2023)
- Lauren Guerra, **Joseph Martínez**, and Francisco Pautt. “Design of a User Interface based on Information Engineering and Web Programming for the FUVADIS customer service process.” Universidad del Norte (2021).

## AWARDS AND ACHIEVEMENTS

<b>International Student Exchange Program</b>	
U.S. Department of Defense (DoD)	Oct 2024
<b>SBP-BRIMS 2023 conference scholarship</b>	
SBP-BRIMS Conference chair	Sep 2022
<b>Outstanding results in the Saber Pro 2021 test</b>	
Universidad del Norte	Nov 2022
· Best overall institutional score	
· Best overall score in Industrial Engineering	
· Perfect score in Generic Competencies	
<b>Graduate Research Assistantship</b>	
Virginia Modeling, Analysis and Simulation Center (VMASC)	Jun 2022
<b>Undergraduate Honorable Mention</b>	
Universidad del Norte	Mar 2022
<b>Andrés Bello Distinction</b>	
Colombian Ministry of Education	Nov 2016
· Distinction to outstanding students in the ICES Saber 11 State Exam for high school	