# Ruben Dario Castro Terrazas

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Ruben Castro | CastroMaster10 |
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## Education

- **Data Science and Mathematics Engineering** *August 2021 - June 2025*
  *Instituto Tecnologico de Monterrey* Monterrey, Nuevo Leon
  - GPA: 3.8

## Experience

- **Undergraduate Research Scholar [🌐]** *August 2024 - Present*
  *Purdue* West Lafayette, IN
  - Applied Deep Learning algorithms to solve nonconvex optimization problems, specifically focusing on the AC-OPF (Alternating Current Optimal Power Flow) problem, which is crucial for optimizing power grid operations by minimizing generation costs while meeting demand and adhering to physical and operational constraints.
  - Conducted extensive research on constrained optimization methods to address large-scale AC-OPF problems in power grids, which are inherently complex due to nonlinearities in the power flow equations.
  - Utilized PyTorch, Python,and NumPy to implement Neural Networks on constrained optimization problems.
- **Data Scientist Jr. [🌐]** *January 2024 - July 2024*
  *Grupo Dportenis* Hybrid, Mazatlan, Sinaloa
  - Implemention of machine learning models on supervised training datasets (transactional data) such as Linear Regressions, XGBoost,Holt-Winter, and Random Forest.
  - Training colleagues in the use of tools like Watson Cloud Park,MySQL, Excel, and Pandas.
  - Implementation of visualization tools such as Tableau for sales forecasting and customer satisfaction.
- **Data Analyst [🌐]** *January 2023 - January 2024*
  *K'STER* Remote
  - Exploratory analysis of land located in Mazatlán for the evaluation of potential in certain tourist areas.

## Projects

- **Gravitational Wave Detection model** *May 2024*
  *Topology, Takens Embedding,Mapper,Python, Logistic Regression* [GitHub]
  - The project aimed to classify gravitational wave signals from noise using Topological Data Analysis (TDA) combined with machine learning techniques, particularly focusing on persistent homology and logistic regression for efficient classification.
  - The application of TDA improved the accuracy of classification with minimal data requirements, showing robustness in noisy environments and providing a clear topological representation of the data. The final logistic regression model achieved an accuracy of 77.7% and an AUC score of 0.85
- **Tourist Route Optimization** *May 2023*
  *Linear Optimization, GAMS, Travelling Salesman Person Problem,Python* [GitHub]
  - Implementation of the mathematical model OP (Orienteering Problem) for designing tourist routes, considering user satisfaction, budget, and duration of stay.
  - Used GAMS to solve the mathematical model, considering Points of Interest (POIs) with time windows, transportation costs, and minimum stay durations to maximize rewards.
  - The optimization ensures routes respect user-defined constraints such as budget and stay durations while achieving an efficient, rewarding travel experience.
- **Natural Language Interpreter** *March 2023*
  *Unsupervised Learning,Word2Vec,NLP* [GitHub]
  - Design a natural language interpreter to identify categories in unprocessed data.
  - Implementation of an unsupervised training technique to identify undefined categories.
  - Provide feedback to the company on how to improve the structure of their stored data.

## Technical Skills

- **Programming Languages:** python, R, SQL,PowerBI,C++, GAMS, Matlab,HANA
- **Libraries and Tools:** pytorch, pandas, numpy, ggplot2, pyplot,sklearn,kedro,MLFlow,Docker
- **Certificates:** Snowflake Associate
- **Math:** Statistics,Calculus, Optimization,Algorithms,Topology, Cryptography,Machine Learning,Deep Learning,Data Processing

- **Certifications:** Snowflake Data Warehouse, AWS Cloud Practioner
- **Certified Languages:** Spanish C2,English C1, German A1
- **Soft Skills:** Effective Communication, Collaborative, Self-learner,Collaborative Work