Simone Reynoso Donzelli

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Summary

I received my BSc. in chemical engineering at the Universidad Iberoamericana in 2022 and got the opportunity to continue my graduate studies at the University of Waterloo. My research focuses mainly on the implementation of novel Machine Learning techniques (Reinforcement Learning) in chemical engineering optimization problems. Besides my engineering background, programming is a big passion of mine and the constant knowledge update has always been very appealing, codes and projects can be found at my GitHub page and Personal Website.

Professional Background

•University of Waterloo *January 2023 - Ongoing*

Graduate student in chemical engineering Waterloo, ON

– Throughout my tenure as a researcher, I have employed various algorithms to address mixed integer dynamic optimization problems. My primary area of emphasis has been on utilizing the Proximal Policy Optimization (PPO) algorithm. I have made adaptations to the neural network of the actors involved in the PPO algorithm, enabling hybrid action selection, and masked discrete action selection. The core objective of my research is to design feasible and near to optimal flowsheets for chemical plants, commencing from an initial inlet stream. As part of the newly developed framework, a connection to advanced simulation suites such as ASPEN Plus was achieved.

•Universidad Iberoamericana *January 2022 - August 2022*

Research assistant Mexico City

– I undertook the development of a Python-based hybrid platform in conjunction with the chemical engineering simulation suite ASPEN Plus. This platform facilitated real-time optimization capabilities. In a specific application of this platform, genetic algorithms were employed, utilizing the pymoo library, to determine the optimal composition of a working fluid within an Organic Rankine Cycle (ORC). The primary objective of this research work was to enhance the efficiency and performance of the ORC system.

Academic Background

•University of Waterloo *2023 - Ongoing*

MS in Chemical Engineering Cummulative GPA:

•Universidad Iberoamericana (IBERO) *2018-2022*

BS in Chemical Engineering Cummulative GPA: 9.6/10

Highest CGPA of the class

•Schweizerschule Mexiko – Colegio Suizo de México (CSM) *2004-2018*

Elementary to High School studies Cummulative GPA: 9.5/10

Highest CGPA of the class

Projects

•AI Based Road Inspection System for Mexico - Omdena *March 2023 - June 2023*

Building and training an intelligent model to detect road defects in real-time. (Lead ML engineer)

As a member of a machine learning (ML) team, I contributed to the development of a web application that enables to detect road defects in real-time. My primary responsibilities encompassed data labeling through the Roboflow web application, as well as conducting research and training of a YOLO algorithm, a pre-trained deep convolutional neural network used for real-time detection. The training process involved utilizing data sets comprising various road irregularities such as cracks, patches, and rutting for real time detection.

– Tools & technologies used: Python (Tensorflow, Pytorch, Scikit, Pandas, others)

•Green Algeria Project - Omdena *September 2022 - December 2022*

Building an intelligent control system for greenhouses (Lead ML engineer)

The primary goal of this project was to determine optimal values for effectively managing temperature, humidity, water usage, light, and other parameters within a greenhouse, while also ensuring timely notification to growers regarding crop-related issues such as growth rate, pests, and diseases. As a member of the team, my responsibilities encompassed exploratory data analysis, involving data cleaning and interpretation. Additionally, I contributed to the research and development of machine learning models to aid in achieving the project objectives.

– Tools & technologies used: Python (Tensorflow, Pytorch, Scikit, Pandas, Numpy, Matplotlib, others)

Technical Skills and Interests

Languages: Spanish (Native), Italian (Native), English (Level C2 with Cambridge Certification), German (Level C1 with Deutsches Sprachdiplom Certification), French (Level B2 with DELF Certification), Chinese (Level A2 with HSK Certification)
Advanced Programming Languages: Python, Microsoft Office Suite, SQL, PowerBi
Intermediate Programming Languages: MatLab, HTML, CSS, JS
Chemical Engineering simulation programs: ASPEN Plus, DWSIM
Soft Skills: Leadership, Communication, Teamwork, Adaptability, Self-Taught, Resourcefulness, Time management
Areas of Interest: Optimization, Engineering (Chemical Engineering), Machine Learning, Data Science. Deep Learning, Reinforcement Learning

Extracurricular and leadership experience

–**Volunteer,** Work with underprivileged children at Gertrudis Bocanegra Institute *August 2016 – June 2018*
–**Dean,** Work in a catholic summer camp in Dublin (Dublin Oak Academy) *June 2015 – August 2015*