Carlos Barreto

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About me

Often described as observant, creative, patient, and persistent, with solid foundations of analytical and problem solving skills

Resourceful and adaptable engineer with experience in different fields, including cyber security, machine learning, electrical engineering, economics, and statistics

Excellent verbal and written communication skills developed working individually and in collaboration with people from diverse backgrounds

Professional Experience

KTH Royal Institute of Technology, Stockholm, Sweden September 2021 – Present

Postdoctoral Researcher

- Built statistical models to analyze cyber insurance markets and found that forcing insurers to share data of security incidents can lead to free riding
- Found the optimal strategies to learn cyber risks when insurers have limited historical information of past incidents
- Supervised 3 master thesis on topics related to cyber security and machine learning

Vanderbilt University, Nashville, TN, US July 2018 - August 2020

Postdoctoral Researcher

- Built models on how customers with smart appliances react to electricity prices to generate large datasets
- Carried out a predictive modeling by training ML-based demand forecasters to implement bidding strategies in electricity markets
- Performed a data analysis on electricity consumption to quantify the effects of different cyber attacks on electricity markets
- Developed scripts to extend the functionality of power grid simulators to implement and analyze different market-based cyber attacks on power systems

University of Texas at Dallas, Richardson, TX, US January 2014 - May 2018

CS Research Assistant

- Managed multiple research projects that involved generating or collecting data, performing data analysis, and collaborating with partners. Published 12 research articles
- Carried out an extensive literature survey on insurance to understand how this financial mechanism can improve the cyber security of IT and industrial systems

- Studied attacks on electricity towers motivated by greed and facilitated by information asymmetries. Proposed a modified auction mechanism that can prevent these attacks

Skills

Programming languages: Python, Java, PHP, SQL

Used in the past: C, C#, VHDL, Verilog

Scientific computing: Python (Numpy/Pandas/SciPy/Scikit-learn/PyTorch/Keras), MATLAB

Software: GNU/Linux, version control (Git and GitHub), command interpreters (Bash scripting)

Languages: English (Fluent), Spanish (Native), Swedish (Beginner)

Education

University of Texas at Dallas, Richardson, TX

Ph.D. and M.Sc. in Computer Science

Relevant Courses: Design and Analysis of Computer Algorithms; Machine Learning; Database Design; Information Security; Cyber-Physical Systems Security and Privacy; Robust Control Systems, Stochastic Dynamic Programming, Information Economics and Mechanism Design

Universidad de los Andes, Bogotá, Colombia

M.Sc. in Electronic Engineering

Relevant Courses: Optimization, Stochastic Processes, Machine Learning, Non-Linear Systems, Game Theory

Universidad Distrital Francisco José de Caldas, Bogotá, Colombia

B.S. in Electronic Engineering

Thesis: Comparative Study over FPGA of Four Embedded Systems based on Soft-Cores and uCLinux

Projects

PDTooldbox Matlab toolbox designed to implement evolutionary dynamics from game theory. It has been used to simulate electricity markets and also to model biological and social populations. Available at https://github.com/carlobar/PDToolbox_matlab

Volunteering

Have served as reviewer of multiple conferences and journals and have participated as program committee member of ICPSS 2021 and GameSec 2021, 2022, 2023

Organized Distinguished Lectures at Digital Futures, a cross-disciplinary research centre in Stockholm, during the spring semester of 2023