

Rafael Alberto Rivera-Soto

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🌐 www.github.com/rrivera1849

Undergraduate researcher at Lawrence Livermore National Laboratory. Passionate about the possibilities between the intersection between Artificial Intelligence and Computer Security.

Employment

Lawrence Livermore National Laboratory

Computer Scientist

Livermore, CA

September 2015–Present

As a Computer Scientist in LLNL, I've worked on a wide variety of efforts some of which include but are not limited to:

- Created models for a coupled transmission-communication simulation for studying the effects of cyber attacks on the transmission system.
- Built a neural network model for predicting the amount of PV generation in a particular distribution installation. Results had to meet
- Built a NARX neural network model for predicting the amount of PV generation in a particular installation.
- Created a convolutional neural network model for identifying the compilers, versions and flags used to create a binary.
- Researching neural network models to identify the author of a particular source code sample.

Education

Academic Qualifications

Stanford University

SCPD Student

Stanford, C.A.

2016–Present

Universidad del Turabo

Bachelor of Science, Computer Engineering, Cumulative GPA 3.78

Gurabo, Puerto Rico

2012–2015

Thomas Alva Edison School

High School

Caguas, Puerto Rico

August 2009–May 2012

Experience

Universidad del Turabo

Research Assistant

Gurabo, PR

August 2013–May 2015

- Assisted professor in researching algorithms for hyper-spectral image compression using neural networks

Internships

Lawrence Livermore National Laboratory

Undergraduate Intern–Cyber Defenders Student Program

Livermore, CA

June 2015–August 2015

- Created an authentication system for an internal web application. The system is able to account for access from three different security classification networks and adjust accordingly.

Lawrence Livermore National Laboratory	Livermore, CA
<i>Undergraduate Intern–Cyber Defenders Student Program</i>	<i>June 2014–August 2014</i>

- Designed a model which describes the amount of time it takes a power grid network to recover to against a certain amount of damage.
- Created a simulation to study the robustness and resilience of the power grid against various attacks.

Lawrence Livermore National Laboratory	Livermore, CA
<i>Undergraduate Intern–Cyber Defenders Student Program</i>	<i>June 2013–August 2013</i>

- Designed a model which describes the effect of cascading power failures in a power grid network.
- Implemented a simulation to study the resilience of different network models against various types of attacks.

Leadership.....

- Founding board member of the ACM (Association for Computing Machinery) and Tau Alpha Omega chapters at the University of Turabo.
- Organized student workshops and documented reunions for the Association for Computing Machinery.

Achievements

Universidad del Turabo	Gurabo, Puerto Rico
<i>Member of the Tau Alpha Omega Engineering Honor Society</i>	<i>March 2014–Present</i>

Universidad del Turabo	Gurabo, Puerto Rico
<i>Caribbean Computer Center of Excellence scholar</i>	<i>August 2012–August 2014</i>

AGMUS Research Symposium	San Juan, Puerto Rico
<i>Presenter at Puerto Rico Researchers Council</i>	<i>March 7, 2014</i>
Presented results of compressing hyper-spectral images using neural networks.	

Insituto Tecnologico de Santo Domingo	Dominican Republic
<i>Participant at Caribbean Finals, ACM-ICPC</i>	<i>November 9, 2013</i>

University of Puerto Rico	Bayamon, Puerto Rico
<i>Second place in the ACM-ICPC Puerto Rico National Competitions</i>	<i>October 5, 2013</i>

University of Puerto Rico	Bayamon, Puerto Rico
<i>Second place in the UPR-Bayamon Computer Programming Competition</i>	<i>April 27, 2013</i>

Projects & Other

Deep Reinforcement Learning Bootcamp	Berkeley, California
<i>University of Berkeley</i>	<i>August 26-27 2017</i>

- Learned the foundations of Deep Reinforcement Learning through a mixture of lectures and hands-on lab sessions.

Machine Learning for Conversational Agents

- Used data from the Ubuntu Dialog Corpus as well as Twitter to create a retrieval-based and generative conversational agent
- Implemented a retrieval-based agent using two LSTM's to encode the question and candidate answers, thereby comparing the similarity between the two and giving it a score
- Implemented a Sequence to Sequence model with an attention mechanism to generate responses to arbitrary conversation context

Machine Learning for Brand Loyalty Prediction

- Using data from the Nielsen Consumer Panel Dataset, developed a brand loyalty prediction system
- Implemented three machine learning techniques: SVM, Multinomial Logistic Regression and K-Means Clustering on consumer data
- The model was able to predict whether or not a user would be loyal to the brand with an accuracy of 95%.

Algorithm Implementations

- Implemented various algorithms: Tries, Merge Sort, Quick Sort and contributed them to an open source project: <https://github.com/kennyledet/Algorithm-Implementations>

Skills

Programming Languages: Proficient in Python, C++ Strong Experience in C and Java

Environment Windows, Linux

Deep Learning Libraries: PyTorch, Tensorflow, Keras

Computer Forensic Tools: IDA, OllyDbg, Autopsy

Fluent Spanish and English speaker

Publications

- [1] J. Coignard, T. Nouidui, C. Gehbauer, M. Wetter, J.-Y. Joo, P. Top, R. R. Soto, B. Kelley, and E. Stewart. Cyder - a co-simulation platform for grid analysis and planning for high penetration of distributed energy resources. page to appear, 2017.
- [2] J. O. N. Colón, Y. M. Masalmah, C. M. Nieves, and R. R. Soto. A proposed desktop grid/cloud computing network design for hsi target detection applications. 2015.
- [3] Y. M. Masalmah, C. Martínez Nieves, R. Rivera Soto, C. Velez, and J. Gonzalez. A framework of hyperspectral image compression using neural networks. In *Latin American and Caribbean Conference for Engineering and Technology Proceedings*, volume 13. Univ. del Turabo (Puerto Rico), 2015.
- [4] P. Top, E. Banks, P. D. B. Jr., S. Bromberger, B. M. Kelley, R. R. Soto, B. Salazar, S. G. Smith, and N. Yee. Simulation of a rtu cyber attack on a transformer bank. page to appear, 2016.