Esteban Rodríguez Betancourt

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ABOUT ME

I'm a software engineer and ML researcher with over 10 years of experience across embedded systems and large-scale distributed services. I design and optimize performance-critical production systems and conduct research in self-supervised learning and representation methods as part of my PhD. My work spans high-throughput engineering and practical ML, with a focus on efficiency, reliability, and clear system design.

WORK EXPERIENCE

Microsoft - Software Engineer II   Sept 2021 - present

– Software Engineer at Skype Experimentation and Configuration Service

– Designed and implemented a new indexing system for the query engine, initially as a hackathon project, later put into production. This optimization improved average latency by 20%-33%, reduced average CPU usage by 2.69%-30%, decreased maximum indexing time by 88%, and lowered memory usage by 66%-75%. The implementation included extensive unit tests and property based testing using FsCheck, ensuring high correctness and reliability.

– Implemented Stitching, a feature for importing values from other configurations, helping to reduce the effort required to write and manage configurations.

– Implemented automation workflows to enhance on-call rotations, reducing the toll load on OCEs.

Universidad de Costa Rica - Professor   Aug 2022 - July 2024

– Professor at the School of Computer Science and Informatics (ECCI).

– Taught "Programming 2" and "Parallel and Concurrent Programming".

– In addition to the usual curriculum, I implemented modern programming practices, such as performance tunning with Callgrind, memory sanitization with Valgrind, proper build systems using CMake, modern C++ techniques such as functional programming and smart pointers, debugging using GDB, setting up CI environments with strong unit tests and static verifiers and teamwork methodologies, using Git and code reviews.

Amazon - Software Developer Engineer 2   July 2020 - September 2021

– SDE2 at the Seller Support Tools team.

– Used Angular, StencilJS, Javascript, Typescript and Java.

– Achieved 2nd place in the internal PSAS hackathon for building a tool to analyze auditor feedback using NLP.

Hewlett Packard Enterprise   July 2015 - July 2020

– Software Engineer, HPE Wired Switches Division (Aruba Networks), focusing on OS subsystems and network protocols.

– Worked on multiple systems on networking operating systems, such as OpenSwitch and ArubaOS-CX.

– OVSDB (dev/product owner), Port Blocking (dev/scrum master), Memory Profiling, L3 Resource Manager, BFD, Linux/Yocto, Counters/Statistics, 32 to 64 bits porting.

– Used C, C++, Go, Python, Bash

– Several contributions to open source Open vSwitch project, mostly on OVSDB core (Skiplist indexing, faster strong/weak keys mutation implementation).

Universidad de Costa Rica - Course Assistant March 2015 - July 2015

Assistant for "Computational Paradigms" course.

Universidad de Costa Rica - Research Assistant February 2013 - June 2015

Assistant at the UCR Geophysical Research Center (CIGEFI). Developed tools for processing and analyzing several terabytes of meteorological data using Go, Python, Bash, Matlab, C, Fortran and others. Developed data visualization tools (HTML 5, AngularJS, Matplotlib).

Colegio Monterrey - Math Olympiad Tutor February 2008 - December 2008

Tutor for the high school Costa Rican Math Olympiad (OLCOMA) team.

EDUCATION

2023 – present	**Ph.D. in Computer Science**, Universidad de Costa Rica. Research has been focused on self-supervised learning and semantic shift.
2018 – 2022	**M.Sc. in Computer Science and Informatics**, Universidad de Costa Rica. TFIA about semantic shift detection in Spanish before and after COVID.
2012 – 2014	**B.Sc. in Computer Science and Informatics**, Universidad de Costa Rica
2008 – 2011	**Computer Engineering Studies**, Instituto Tecnológico de Costa Rica. Transferred to Universidad de Costa Rica

OTHER COURSES

June 2022	Coursera, DeepLearning.ai Natural Language Processing Specialization. Credential link.
September 2020	Udacity, AWS Cloud Architect Nanodegree. Credential link.
May 2018	Udacity, Artificial Ingelligence Nanodegree. Credential link.
May 2018	Udacity, Deep Learning Foundation Nanodegree. Credential link.

PUBLICATIONS

Rodríguez-Betancourt, Esteban and Edgar Casasola-Murillo (2026). *Hypersolid: Emergent Vision Representations via Short-Range Repulsion*. arXiv: 2601.21255 [cs.CV]. URL: https://arxiv.org/abs/2601.21255.

– (2024a). *From cart to truck: meaning shift through words in English in the last two centuries*. arXiv: 2408.16209 [cs.CL]. URL: https://arxiv.org/abs/2408.16209.

– (Sept. 2024b). "Teaching SQL New Tricks: Efficient Vector Indexing with Trigrams". In: *JAIIO, Jornadas Argentinas de Informática* 10.1, pp. 150–157. URL: https://revistas.unlp.edu.ar/JAIIO/article/view/17913.

– (2023a). "Exploring the Limits of Large Language Models for Word Definition Generation: A Comparative Analysis". In: *2023 XLIX Latin American Computer Conference (CLEI)*, pp. 1–7. DOI: 10.1109/CLEI60451.2023.10346136.

– (Sept. 2023b). "Extended Analysis of the Semantic Shift in Diachronic Word Embeddings for Spanish Before and After COVID-19". In: *CLEI Electronic Journal* 26. DOI: 10.19153/cleiej.26.2.4.

– (2022). "Analysis of Semantic Shift Before and After COVID-19 in Spanish Diachronic Word Embeddings". In: *2022 XVLIII Latin American Computer Conference (CLEI)*, pp. 1–9. DOI: 10.1109/CLEI56649.2022.9959896.

Rodríguez-Betancourt, Esteban et al. (2019). "Deep Neural Network Comparison for Spanish Tweets Polarity Classification". In: *2019 XLV Latin American Computing Conference (CLEI)*, pp. 1–6. DOI: 10.1109/CLEI47609.2019.235083.