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Elvis Rojas

Curriculum Vitae

Research Interests

High Performance Computing

- Fault tolerance
- Log failure analysis
- Distributed Computing
- Parallel programming
- Deep Learning resilience

Educational Background

2018 – 2022
Doctor of Engineering, *Costa Rica Institute of Technology*.
Cartago, Costa Rica

2009 – 2007
Master of Science in Telematics, Costa Rica Institute of Technology.
Cartago, Costa Rica

2004 – 2001
Bachelor of Engineering in Information Systems, *National University of Costa Rica*.
Pérez Zeledón, San José, Costa Rica

2003 – 2001
Associate Degree in Applications Programming, *National University of Costa Rica*.
Pérez Zeledón, San José, Costa Rica

Research Experience

2022
Forschungszentrum .
Jülich, Germany
- Research assistant at the Jülich Supercomputing Centre (JSC).

2018 – 2022
National High Technology Center (CeNAT).
San José, Costa Rica
- Research assistant at the Advanced Computing Laboratory (CNCA).

2020
Barcelona Supercomputing Center (BSC).
Barcelona, España
EuroLab4HPC Internship
- Research assistant

2010–2023 **National University of Costa Rica**.
San José, Costa Rica
- Research on High Performance Computing, Fault Tolerance in HPC, Deep Learning, Parallel computing.

Publications

[Núñez et al., 2024] Núñez, G., Romero-Sandí, H., Rojas, E., and Meneses, E. (2024). A study of pipeline parallelism in deep neural networks. *Revista Colombiana de Computación*, 25(1):48–59.

[Rojas, 2012a] Rojas, E. (2012a). Propuesta para el desarrollo de un sistema de marketing de proximidad. In *II Congreso Internacional de Computación y Matemática*. Universidad Nacional de Costa Rica.

[Rojas, 2012b] Rojas, E. (2012b). *Sistema de Marketing de proximidad basado en Tecnología Bluetooth: Análisis, desarrollo e implementación*. Editorial Académica Española, first edition.

[Rojas et al., 2020a] Rojas, E., Bogdan, N., and Meneses, E. (2020a). Evaluating resilience of deep learning models. *Tecnología en marcha*, Special edition(33):25–30.

[Rojas et al., 2021a] Rojas, E., Kahira, A. N., Meneses, E., Gomez, L. B., and Badia, R. M. (2021a). A study of checkpointing in large scale training of deep neural networks.

[Rojas et al., 2022a] Rojas, E., Knobloch, M., Daoud, N., Meneses, E., and Mohr, B. (2022a). Early experiences of noise-sensitivity performance analysis of a distributed deep learning framework. In *2022 IEEE International Conference on Cluster Computing (CLUSTER)*, pages 516–522.

[Rojas et al., 2019] Rojas, E., Meneses, E., Jones, T., and Maxwell, D. (2019). Analyzing a five-year failure record of a leadership-class supercomputer. In *2019 31st International Symposium on Computer Architecture and High Performance Computing (SBAC-PAD)*, pages 196–203.

[Rojas et al., 2020b] Rojas, E., Meneses, E., Jones, T., and Maxwell, D. (2020b). Towards a model to estimate the reliability of large-scale hybrid supercomputers. In Malawski, M. and Rzadca, K., editors, *International European Conference on Parallel and Distributed Computing (Euro-Par 2020): Parallel Processing*, pages 37–51, Cham. Springer International Publishing.

[Rojas et al., 2021b] Rojas, E., Meneses, E., Jones, T., and Maxwell, D. (2021b). Understanding failures through the lifetime of a top-level supercomputer. *Journal of Parallel and Distributed Computing*.

[Rojas et al., 2022b] Rojas, E., Perez, D., and Meneses, E. (2022b). Exploring the effects of silent data corruption in distributed deep learning training. In *2022 IEEE 34th International Symposium on Computer Architecture and High Performance Computing (SBAC-PAD)*, pages 21–30, Los Alamitos, CA, USA. IEEE Computer Society.

[Rojas et al., 2021c] Rojas, E., Pérez, D., Calhoun, J. C., Gomez, L. B., Jones, T., and Meneses, E. (2021c). Understanding soft error sensitivity of deep learning models and frameworks through checkpoint alteration. In *2021 IEEE International Conference on Cluster Computing (CLUSTER)*, pages 492–503.

[Rojas et al., 2024] Rojas, E., Pérez, D., and Meneses, E. (2024). A characterization of soft-error sensitivity in data-parallel and model-parallel distributed deep learning. *Journal of Parallel and Distributed Computing*, 190:104879.

[Rojas et al., 2022c] Rojas, E., Quirós-Corella, F., Jones, T., and Meneses, E. (2022c). Large-scale distributed deep learning: A study of mechanisms and trade-offs with pytorch. In Gitler, I., Barrios Hernández, C. J., and Meneses, E., editors, *High Performance Computing*, pages 177–192, Cham. Springer International Publishing.

[Rojas and Romero, 2013a] Rojas, E. and Romero, H. (2013a). La gamificación como como participante enel desarrollo del b-learning: su percepción en la universidad nacional,sede regional brunca. In *Latin American and Caribbean Conference for Engineering and Technology. "Innovation in Engineering, Technology and Education forCompetitives and Prosperity*.

[Rojas and Romero, 2013b] Rojas, E. and Romero, H. (2013b). Sistema de retroalimentación académica: unapropuesta de mensajería por proximidad aplicada en la universidadnacional, sede regional brunca. In *Latin American and Caribbean Conference for Engineering and Technology. "Innovation in Engineering, Technology and Education forCompetitives and Prosperity*.

[Romero-Sandí et al., 2024] Romero-Sandí, H., Núñez, G., and Rojas, E. (2024). A snapshot of parallelism in distributed deep learning training. *Revista Colombiana de Computación*, 25(1):60–73.

Teaching Experience

2005 – 2023 **National University of Costa Rica**.
San José, Costa Rica
Faculty of Engineering
- Computer and Communication Networks, Data Structures, Data Base Systems,Computer Architecture, Data Communications Devices, C++ Programming, PyThon Programming, ASM programming, Basic Digital Circuits Design.

2011 – 2014 **National University of Costa Rica**.
San José, Costa Rica
Faculty of Engineering
- CISCO Instructor: CCNA modules I, II, III, IV and IT Essentials.

Management Experience

2024 – 2025 **Dean**.
Universidad Naional
- Dean of the Sede Regional Brunca

2024
2023

Workshop chair.

Workshop chair

- Latin America High Performance Computing Conference (CARLA 2024) `https://carla2024.org/board-committee/`
- Latin America High Performance Computing Conference (CARLA 2023) `https://www.carla2023.org/en/board-committe`

2017
2010

National University of Costa Rica.

San José, Costa Rica

Faculty of Engineering

- Engineering in Information Systems academic program manager