Cristian Enrique Muñoz Villalobos

CONTACT INFORMATION

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RESEARCH INTERESTS

Deep Learning for Multiple Data Types: machine learning | data mining | deep learning | big data | cloud computing | natural language processing | computer vision | gpu computing | optimization | high performance computing | distributed computing

PROFESSIONAL EXPERIENCE

Holistic AI, London, United Kingdom
Holistic AI provides a software solution for ethical and safe AI risk management and auditing

Senior Research | Machine Learning Engineer **May 2022 to present**

- Engineered a tool for the analysis and mitigation of technical risks associated with artificial intelligence technologies.
- Developed an open-source application aimed at assessing and enhancing the trustworthiness of AI systems.
- Created benchmarks for evaluating Large Language Models (LLMs) in terms of technical risks, including efficacy, robustness, and privacy.

Applied Computational Intelligence Laboratory , PUC-RIo, Rio de Janeiro, Brasil
An AI laboratory focused on education, research, and technological advancement.

Data Science Advisor **May 2022 to present**

- Advise on the design of solutions using AI.

Senior Data Scientist **March 2018 to April 2022**

- Coordinate development team activities.
- Ensuring implementation of policies and practices .
- Design Deep Learning models for NLP and CV Applications .
- Integrate services with Cloud Computing and Clusters .

Junior Data Scientist **March 2012 to 2018**

- Developing software using Shell, C++ and C# .
- Control Resource Manager using PBS Torque and SLURM.
- Version Control using Git.
- Working using Scrum methodology.

CONSULTING EXPERIENCE

International Labour Organization - ILO, Lima, Perú

- Extracted information from corporate documents using natural language processing techniques.

- Developed an Information Extraction System to organize, classify and group daily news.

Holistic AI, London, United Kingdom

- Developed Artificial Intelligence systems for the generation of synthetic data.

TEACHING EXPERIENCE

Pontifical Catholic University of Perú (PUCP), Lima, Perú

Assistant Professor (QLAB PUCP) **June 2022 to present**

- Natural Language Processing for CCSS and Public Services

Pontifical Catholic University of Rio de Janeiro (PUC-Rio), Rio de Janeiro, Brasil

Assistant Professor (CCE PUC-Rio) **March 2016 to April 2022**

- Decision Support Methods in Python, Introduction to MATLAB, and Deep Learning.

Instructor **March 2016 to March 2019**

- ELE 2399: Fuzzy Logic, ELE 2762: Deep Learning, ENG 1361: Applied Computational Intelligence. ENG 1448: Digital Systems, ELE 2761: High Performance Computing, ELE 2395: Evolutionary Computing.

EDUCATION	**Pontifical Catholic University of Rio de Janeiro**, Rio de Janeiro, Brasil

Ph.D. Electrical Engineering, August 2015 to August 2019
- Thesis title: *Knowledge Extraction from text documents using Augmented Memory Networks*
- Advisor: Professor Ricardo Tanscheit

M.Sc. Electrical Engineering, March 2012 to March 2014
- Thesis title: *Heterogeneous Parallelization for Quantum Inspired Linear Genetic Programming*
- Advisor: Professor Marco Aurelio Cavalcanti Pacheco

National University of Engineering, Lima, Perú

B.Sc., Mechanical Engineering - Mechatronics Engineering, June 2005 to July 2010

RESEARCH EXPERIENCE	**Pontifical Catholic University of Rio de Janeiro**, RJ, Brazil

Applied Computational Intelligence Laboratory   **March 2012 to present**

Project development in Finance, Energy, and Oil & Gas areas. Parallel and distributed computing, optimization and machine learning techniques was used for computer vision and natural language processing tasks.

- BIG ANCHORING Project: (Advisor) Creating of Data Lake repositories for Big Data applications. Connect different source databases and applications using Kafka, MongoDB and Kubernetes.

- PROXY Project: (Advisor) Create a proxy model for reservoir simulator using deep learning models.

- BIG OIL Project: (Advisor) Creating of Data Lake repositories for Big Data applications. Information retrieval from text documents and videos using Deep Learning techniques.

- OCTOPUS 3 project: Increase the computation power using distributed system: resource managers like Torque PBS and implement new functionalities using Hadoop platform.

- OCTOPUS 2 Project: Well location optimization system for Petrobras. The system is able to choose the best configuration of wells (and their types) given the oil field, in order to maximize the net present value (NPV).

- APOGEU Project: Intelligent system to support the management of contracting services that allow: Formation of standard prices, more accurate analysis of proposals, improvement of the negotiation of proposals, monthly monitoring of contract costs and inference and monitoring of indicators.

- PrevIn Project: Intelligent system to support the management of energy efficiency, capable of identifying and prioritizing customers that present opportunities to reduce demand and consumption, capable of guiding consumers to conserve and use electricity rationally.

PATENTS

1. METHOD FOR EXTRACTING AND STRUCTURING INFORMATION. Registered on November 26, 2021. Patent number BR 10 2021 023977-8.

BOOKS AND PUBLICATIONS

1. Airlie Hilliard, **Cristian E. Munoz**, Zekun Wu, and Adriano S. Koshiyama. Eliciting Big Five Personality Traits in Large Language Models: A Textual Analysis with Classifier-Driven Approach. arXiv preprint arXiv:2402.08341. (2024).

2. **Cristian E. Munoz**, Kleyton da Costa, Bernardo Modenesi, and Adriano S. Koshiyama. Evaluating explainability for machine learning predictions using model-agnostic metrics. arXiv preprint arXiv:2302.12094. (2023).

3. **Cristian E. Munoz**, Sara Zannone, Umar Mohammed, and Adriano S. Koshiyama. Uncovering Bias in Face Generation Models. arXiv preprint arXiv:2302.11562. (2023).

4. Leonardo Forero, **Cristian Enrique M. Villalobos**, Harold De Mello, Cesar Valencia; and Alvaro Orjuela. "Sentimental Analysis on Social Media Comments with Recurring Models and Pretrained Word Embeddings in Brazilian Portuguese", NLPIR 2022, Bangkok, Thailand (2022).

5. Potratz, Júlia; **Cristian Enrique M. Villalobos**; Smith WA Canchumuni; and Marco Aurélio C. Pacheco. "Deep learning for mapping rainwater drainage networks using Remote Sensing Data", CILAMCE 2021, Rio de Janeiro - Brazil (2021).

6. Jose D. Bermudez Castro ; Smith WA Canchumuni; **Cristian E. Muñoz Villalobos** ; Fábio Corrêa Cordeiro ; Antônio Marcelo Azevedo Alexandre ; and Marco A. Cavalcanti Pacheco. Ïmprovement Optical Character Recognition for Structured Documents using Generative Adversarial Networks", ICCSA 2021, Cagliari - Italy (2021).

7. Cordeiro, Fábio Corrêa ; **Villalobos, Cristian Enrique Munoz** . Petrolês - How to Build a Specialized Oil and Gas Corpus in Portuguese. Rio Oil and Gas Expo and Conference, v. 20, p. 387-388, 2020.

8. **Cristian Muñoz**, Leonardo Mendoza and Ricardo Tanscheit "Construction of a Transformer-based model for Relation Extraction", CBIC 2019, Belén - Brazil (2019)

9. Jose David Bermudez Castro, Ricardo Rei, Jose E. Ruiz, Pedro Achanccaray Diaz, Smith Arauco Canchumuni, **Cristian Muñoz Villalobos**, Felipe Borges Coelho, Leonardo Forero Mendoza, Marco Aurelio C. Pacheco "A free web service for fast COVID-19 classification of chest X-Ray images", arXiv:https://arxiv.org/abs/2009.01657

10. Costa, Leandro Santos DA ; Blank, Frances Fischberg ; Oliveira, Fernando Luiz Cyrino ; Villalobos, **Cristian Enrique Muñoz** . Conditional Pricing Model with Heteroscedasticity: Evaluation of Brazilian Funds. RAE-Revista de Administracao de Empresas, v. 59, p. 225-241, 2019.

11. Arthur Silveira, **Cristian Muñoz** and Leonardo Mendoza "Severe Asthma Exacerbations Prediction Using Neural Networks", EANN 2019, Crete - Greece (2019)

12. Leonardo A. Forero Mendoza, **Cristian Muñoz**, Manoela Kohler, Evelyn Batista and Marco A. Pacheco "Analysis and Classification of Voice Pathologies using Glottal Signal Parameters with Recurrent Neural Networks and SVM", ICAART 2019, Prague - Czech Republic (2019)

13. Gabriel Lins Tenorio, **Cristian E. Muñoz Villalobos**, Leonardo A. Forero Mendoza, Eduardo Costa da Silva and Wouter Caarls, "Improving Transfer Learning Performance: an Application in the Classification of Remote Sensing Data", ICAART 2019, Prague - Czech Republic (2019)

14. Juan G. Lazo Lazo, Rogério Póvoa, **Cristian E. Muñoz V.**, "Arrears identification for markets of large customers and public sector", CITENEL, Rio de Janeiro, Brasil (2013)

15. Pedro Achanccaray, **Cristian Muñoz**, Luis Rojas and Ricardo Rodriguez, "Human Computer Interface based on hand tracking", Accepted to be presented in MUSME 2011,V-3478-2011, pag. 293, October 25-28-2011, Valencia, España (2011)

16. **Cristian E. Muñoz** V.,Oscar A. Villalta R., Alhiet Orbegoso, "Matlab 2010", MACRO E.I.R.L. (2010)

REFERENCES AVAILABLE TO CONTACT

Ph.D. Leonardo Forero Mendoza (e-mail: mendonza@ele.puc-rio.br)
- Professor, Universidade do Estado do Rio de Janeiro,
- ⋆ *Ph.D. Mendoza has been my direct supervisor in several research projects.*

Ph.D. Juan G. Lazo Lazo (e-mail: jg.lazol@up.edu.pe)
- Professor, Universidad del Pacífico
- ⋆ *Ph.D. Lazo was my supervisor in many research projects at ICA laboratory.*

Ph.D. Douglas Mota Dias (e-mail: douglasm@ele.puc-rio.br)
- Professor, Universidade do Estado do Rio de Janeiro,
- ⋆ *Ph.D. was my master supervisor.*

Ph.D. Marco A. Pacheco Cavalcanti (e-mail: marco@ele.puc-rio.br)
- Professor, Pontifical Catholic University of Rio de Janeiro,
- ⋆ *Ph.D. Marco Aurelio was my advisor during my masters studies.*

LANGUAGES   Spanish, Portuguese, English.