Hugo Cisneros

PhD student in Computer Science: Machine Learning and Complex Systems.

Personal Data

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GitHub: https://github.com/hugcis/

Work & Research Experience

Apr - Nov 2019 — **CIIRC (Czech Institute of Informatics, Robotics and Cybernetics)** *Research Intern*, Prague

Under the supervision of Tomas Mikolov (Facebook AI Research).

- Studied emergence, complexity and spontaneous organization in complex systems and their applications to Artificial intelligence.
- Built a neural network-based complexity metric for measuring emergence in cellular automata and other dynamical systems (implemented in **C**) which led to a peer-reviewed publication. [GitHub]

Mar - Sep 2018 — **INRIA and CNRS (LIMSI)** *Research Intern*, Paris

Under the supervision of Xavier Tannier and Ioana Manolescu.

- Built a pipeline generator for extracting and integrating multiple data sources with **Natural language processing (NLP) and data processing algorithms** for data journalism. [GitHub]
- Collaborated with journalists from *Le Monde (Les Décodeurs)* on automating their data processing pipelines and using NLP for their investigations.
- Reviewed literature on **machine learning in graphs**, **automatic knowledge base construction** and **natural language processing for fact checking**.

Jun 2017- Mar 2018 — **Aiden.ai** *Software engineering and Machine Learning Intern*, London

Built an AI powered virtual colleague for Marketing analysts based on **Natural Language Processing**. Implemented machine learning pipelines with **Python** for marketing data forecasting, classification and user clustering. Participated in implementing the chat interface and the Natural Language recognition system with **Javascript**.

Sep 2016 - Feb 2017 — **ENS Ulm, Kastler-Brossel Laboratory** *Research assistant*, Paris

Light control and propagation in amplified multimode fibers

Implemented and optimized finite elements simulations with **Python** and **Matlab**. Performed high performance computing on large distributed clusters. Worked with PhD candidate Tom Sperber on building a tool for optimizing the propagation of a light beam in optical fibers. [Report]

Education

Jan 2023 – Nov 2019 — PhD Student **INRIA, CIIRC CTU** (Czech Technical University in Prague), Paris & Prague

Unsupervised learning with Complex Systems and Evolution

Under the supervision of Tomas Mikolov and Josef Sivic. Topics: complex dynamical systems, self-organization, artificial evolution, artificial intelligence.

Supervision of Master-level theses and internship projects.

Sep 2019 – Sep 2018 — MVA Master in Machine Learning and Applied Mathematics, **ENS Paris Saclay**, Paris

Relevant Coursework: Convex Optimization, Probabilistic Graphical Models, Computer Vision, Reinforcement Learning, Deep Learning, Speech and Natural language processing, Kernel Methods, Biostatistics, Theoretical Foundations of Deep Learning — (GPA: 16.2 / 20)

Sep 2018 – Sep 2015 — Master of Science in Engineering, **Mines ParisTech**, Paris

Specialization: Computer Science — (3.7 GPA)

Relevant Coursework: Machine Learning, Probabilities, Statistics, Programming

Aug 2015 – Sep 2013 — Preparatory class for *Grandes Ecoles* **Lycée Stanislas** (Paris) MPSI and MP*

Bachelor's Degree in Mathematics and Physics, national competitive exam for entering engineering school.

Aug 2013 — Scientific Baccalauréat (High school diploma in Maths, Physics and Life Sciences) - High distinction

Publications

Herel, D., Cisneros, H., & Mikolov, T. **Preserving Semantics in Textual Adversarial Attacks**. Preprint, under review at ICML 2023.
GitHub repo: https://github.com/DavidHerel/semantics-preserving-encoder

Cisneros, H., Sivic, J. & Mikolov, T. **Benchmarking Learning Efficiency in Deep Reservoir Computing**. First Conference on Lifelong Learning Agents (CoLLAs 2022).
GitHub repo: https://github.com/hugcis/benchmark_learning_efficiency

Cisneros, H., Sivic, J. & Mikolov, T. **Visualizing computation in large-scale cellular automata**. Artificial Life Conference Proceedings 32, 239–247 (2020).

Cisneros, H., Sivic, J. & Mikolov, T. **Evolving Structures in Complex Systems**. in 2019 IEEE Symposium Series on Computational Intelligence (SSCI) 230–237 (IEEE, 2019).
GitHub repo: https://github.com/hugcis/evolving-structures-in-complex-systems.

Projects

Mar - Aug 2021	Participated in the Open-endedness evolution challenge at the GECCO 2021 conference competition track. Developed an open-ended algorithm based on Neural Cellular Automata in **Pytorch** within the game Minecraft. Finished second place. [GitHub][Blog post]
Jun - Aug 2018	Participated in the n2c2 shared task of Harvard Medical School *Cohort Selection for Clinical Trials* in a joint team from AP-HP and LIMSI. Implemented **weakly-supervised and transfer learning methods for Medical NLP** (Keras). Finished 2nd among 30 teams. [Preprint]
Jan 2018	Built a NLP based tool for discovering and matching similar arXiv papers based on similarity measures including **word embeddings-based similarities** of their abstract and **co-authorship graph distance**. [GitHub]
Feb 2017	Implemented a multi-currency blockchain in Python with a team of 9 people (Cryptography, network programming, team software development)

Programming Skills

Advanced:	Python (Tensorflow, Pytorch, Django), C, Rust, SQL (Postgres), Matlab, Java, Javascript (Node.js, Typescript and Web), LaTeX
Basic:	Scala, Ruby, C++

Languages

English:	Fluent	Spanish:	Intermediate
French:	Mothertongue	Japanese:	School level

Interests and Activities

- Mathematics, Statistics and Probabilities
- Technology, Open-Source, Programming
- Creative coding, Generative Art, genocto.xyz
- Running, Hiking, Fencing, Piano, Guitar