Louis Jalouzot

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Education

- **Master's Degree in Fundamental Computer Science (ENS Lyon, France)** *September 2021 - Present*
  - **Optimization:** gradient/(quasi-)Newton methods, constrained optimization, polyhedral method, simplex
  - **Quantum Computing:** search algorithms, density operators, compression, error correcting codes
  - **Parallel Computing:** PRAM, distributed algorithms, scheduling
  - **Compilation:** typing, semantics, CFG, SSA, parallelism
  - **Performance Evaluation:** simulation, statistics, queuing theory, (continuous) Markov chains
  - **English:** thematic course
- **License's Degree in Computer Science (ENS Lyon, France)** *September 2020 - May 2021*
  - **Algorithmics:** data structures, complexity, classical paradigms, graphs, NP-completeness, string search
  - **Computability:** (pushdown) automatons, Turing machines, decidability, P and NP, λ-calculus
  - **Semantics:** denotational/operational/axiomatic semantics, typing
  - **Programmation:** Python, OCaml, C/C++, LaTeX, bash, makefile, ssh, git
  - **Logic:** proof theory, Gödel's (in)completeness theorems, set theory
  - **Probability:** probabilistic methods, Monte Carlo, Markov Chains
  - **Algebra:** groups, rings, fields, Galois theory
  - **Topology:** connectivity, completeness, compacity, differential calculus, Banach/Hilbert spaces
  - **English:** preparation for the CAE
- **Scientific Preparatory Class MPSI and MP*** **(Rennes, France)** *September 2018 - July 2020*
  - Two-year intensive preparation courses for the entrance exams to top French Engineering schools (Grandes Écoles)
  - **Studied subjects:** Mathematics, Physics, Computer Science, French literature, English
- **High School diploma, equivalent to A Levels (Nantes, France)** *July 2018*
  - Scientific option, maths specialty, with honors

Experience

- **AI internship:** meta-learning, Python, PyTorch *Summer 2021, 8 weeks*
  - **Topic:** Program synthesis for the ARC dataset
  - **ARC dataset:** available in this repository and presented in this article by F.Chollet
    - set of similar tasks (meta-learning), each with a few examples (solved instances) and a test instance
    - **Goal:** build an algorithm that can learn to solve a new task only with its examples
    - Performances on one task (resp. globally) should improve with experience on this task (resp. with the number of tasks)
  - Approach by program synthesis: build an algorithm that generates programs which may be a solution to a task
  - My contributions (available with my internship report in this repository):
    - Modeling of ARC tasks
    - Formalization of *prior knowledge* and programs
    - Generation of solved tasks
    - Designing and training of neural networks
- **Reinforcement Learning introduction course (Alan Turing Institute)** *Summer 2021, 1 week*

Projects

- **Contributions to the Toposim Library (integrated project)** *September 2021 - Present*
  - Toposim is a 3D simulation library in C++ based on CGAL
  - **Goals of the project:**
    - Implement collisions, mesh cutting/refining
    - Study validity domains of several integration methods
    - Create a GUI to render a video from multiple mesh files
  - C++, Python, git, Qt, Blender, bash
- **Creation of a C compiler (course)** *September 2021 - January 2022*
  - Compiler for a simplified version of C into RISC-V assembly code
  - Implementation of code optimization techniques
  - Python, git, ANTLR, RISC-V
- **Creation of an OCaml interpreter (course)** *January 2020 - May 2021*
  - For interpreting a simplified version of OCaml, coded in OCaml
  - OCaml, git, bash

Technical Skills

- **Languages:** Python (advanced), C/C++ (advanced), OCaml (advanced), bash (intermediate)
- **Applications:** VSCode, Coq, SolidWorks
- **OS:** LINUX, Windows, Android
- **Other tools:** Qt (familiar with), git (intermediate), SQL (basic notions)

Additional Information

- I will attend more AI-related courses during the second semester of my Master's Degree:
  - Machine Learning
  - Data Bases and Data Mining
- I speak French (native language) and English (I will attend the CAE in January 2022).

References

- **Aurélien Garivier (ENS Lyon, UMPA, LIP)**
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- **Nathanaël Fijalkow (CNRS in LaBRI, The Alan Turing Institute)**
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