

Alexandre Tytgat

Recent graduate in data science/ML engineering

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EDUCATION

- **MSc in Data Science, *cum laude***

Université catholique de Louvain, 2019-2021

- Minor in numerical methods and optimization.
- Thesis: Analysis of a new interpretation of AI learning process. Received a grade of 16/20.

- **BSc in Physics, *cum laude***

Université catholique de Louvain, 2015-2019

- Minor in mathematical physics.
- Thesis: New approach to dark matter as a quantum interaction phenomena. Received a grade of 18/20.
- Lab tutor on waves physics, *Feb-May 2019*.

PROJECTS

- **Machine learning**

- Trained a MLP over meteorological and air-quality data collected in China to predict the concentration of fine particle in the air of Beijing.
- Used an ensemble learning approach to distinguish between T-helper and T-regulatory cells, known to be hard to differentiate.
- Created a BERT embedding of online comments from a political forum and trained a randomforest over it to predict the political affiliation of users'.

- **Simulation**

- Built a one-dimensional energy balance climate model by numerically solving a simplified version of the equations that governs the climate of the Earth.
- Simulated the orbits of Jupiter and Saturn around the Sun, an instance of the three body problem, using symplectic methods to solve the equations of motion.
- Solved the Schrodinger equation of a particle in a potential well excited by a time varying external EM field using a spectral method approach.

- **Statistics**

- Created a Bayesian model relating the body mass to the brain weights of several animals, using JAGS.
- Built a mixed error-component model in SAS to investigate the effect of a treatment on the reaction time of sleep deprived patients.

- **Optimization**

- Implemented a constraint programming approach to solve the Dial-a-Ride problem with time windows.
- Solved instances of (i) Newton's problem of minimal resistance in the AMPL environment, (ii) a total variation image denoising problem using the subgradient method, (iii) the p-center location problem with the MOSEK solver.

SKILLS

- **Fields of knowledge**

Machine learning, data analysis, mathematical modelling, numerical methods, Bayesian statistics, advanced statistical modeling.

- **Programming languages**

Proficiency: Python, Java, R, SQL.

Intermediate proficiency: Matlab, C++, SAS, AMPL.

- **Packages**

Scikit-Learn, Numpy, Pandas, Spacy, Seaborn, NLTK, Gensim, Word2Vec, NetworkX, Matplotlib, Caret, JAGS.

- **Tools**

Anaconda, Jupyter Notebook, Google Colab, Git

LANGUAGES

French
Native

English
Proficient

Spanish
Elementary