Alexandre **Tytgat**

Junior Machine Learning Engineer

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Skills

Programming Languages ***Experienced:*** Python, R, Java. ***Familiar:*** SQL, Matlab, SAS, C++, AMPL.

ML Libraries Scikit-Learn, Pytorch, NumPy, Pandas, spaCy, NLTK, Gensim, Doc2Vec, Seaborn, Matplotlib, JAGS, Caret, glmnet.

Tools Git, Anaconda, Jupyter Notebook, Excel, Google Colab.

Languages ***Native:*** French. ***Fluent:*** English. ***Beginner:*** Spanish.

Education

MSc in Data Science, *with distinction*

UCLouvain, Belgium

Specialization in numerical methods and optimization. *09/2019 - 09/2021*

- Relevant courses: databases (SQL, NoSQL), machine learning (supervised learning, unsupervised learning, reinforcement learning, deep learning, CNN, NLP), data visualization, Bayesian statistics.
- Student representative for the academic year 2020-2021.
- Thesis: Study of a new interpretation of the learning process of AI. Obtained the grade of 16/20. *Online access*

MSc in Physics

UCLouvain, Belgium

Specialization in statistical and mathematical physics. *09/2018 - 09/2019*

- Dropped out after a year to study data science.

BSc in Physics, *with distinction*

UCLouvain, Belgium

Specialization in mathematical physics. *09/2015 - 09/2019*

- Student representative for the academic year 2018-2019.
- Thesis: A new approach to dark matter as a quantum interaction phenomena. Obtained the grade of 18/20.

Projects

Air quality prediction

GitHub link

Goal : Predict the concentration of fine particles in the air of Beijing using meteorological data collected by the Beijing Municipal Environmental Monitoring Center. *Nov. 2019*

- Data pre-processing: transformed the time and the wind direction features in a way that takes into account their cyclical nature.
- Selected the five most informative features about the target variable to train the model on, as evaluated by the mutual information.
- Trained a one layer neural network on the resulting dataset, and performed a 5-fold cross validation scheme to select the best performing model.

T-cells Identification

GitHub link

Goal : Use hand annotated datasets of gene expression to train machine learning algorithms in order to automatically classify new single-cell datasets. *May. 2020*

- Carried out the data pre-processing, and applied PCA to reduce the number of features from >23.000 to less than a hundred.
- Reduced the bias in the dataset using the SMOTE method to artificially balance the classes.
- Performed 5-fold cross validation over several models (randomforest, XGBoost, etc.), and selected the six best performing ones. A voting system was employed to make the final prediction, resulting in a balanced accuracy of 0.78 on the test set.

Political Comments Classifier

GitHub link

Goal : Predict the political affiliation of users from their Reddit comments using modern NLP techniques. *Nov. 2020*

- Performed the necessary pre-processing of the comments using Gensim and NTLK.
- Created one BERT embedding of the comments and trained a Doc2Vec model to create a second embedding.
- For each embedding, a randomforest was trained to identify the political affiliation of the comments. The BERT model obtained an accuracy of 0.75 on the test set.

Extracurricular

Lab tutor on wave mechanics *UCLouvain, Belgium*

02/2019 - 05/2019

- Prepared lectures to introduce students to the theory and to the experimental apparatus.
- Monitored and guided the students to successfully realize the desired observations.
- Charged with grading the lab reports and took the initiative to provide individual feedback after each session.

Scout Leader *Les Scouts ASBL, Belgium*

09/2020 - PRESENT

- Worked as part of a team to plan events, carry out fundraisers, and oversee camping trips.
- Communication lead of the section. Entrusted to inform, negotiate, and coordinate with the other sections.
- Organized educational and engaging activities addressed to teenagers. Topics included environment protection, refugees in Europe, and conflict management.