

Christos Theodoropoulos

Doctoral Researcher at LIIR, KU Leuven
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Professional and Research Experience

Doctoral Researcher

Sep. 2020 – Present

LIIR, KU Leuven

Leuven, Belgium

- Conduct research in the relation extraction field applied to biomedical and news text with a focus on continual learning.
- Develop an end-to-end open-sourced paradigm for continuous knowledge extraction from text using biomedical publications related to alzheimer's disease and rett syndrome.
- Implemented a framework using the contrastive learning paradigm, incorporating knowledge graphs and unstructured text.
- Fulfill teaching assistant duties for the "Information Retrieval and Search Engines" course, like preparing and presenting exercise sessions and project assignments.

Research Scientist Intern

Jul. 2022 – Nov. 2022

IBM Research

Dublin, Ireland

- Conducted research on Person-Centric Knowledge Graph Extraction from Electronic Health Records (EHR) using HSPO ontology with a high degree of independence.
- Applied Graph Neural Network (GNN) training for solving Intensive Care Unit (ICU) readmission prediction.
- Experimented with embedding learning for heterogeneous graphs.
- Abstractly developed the framework to be applicable to other downstream predictive tasks (e.g. mortality prediction).
- Heavily contributed to IBM's open-source project (HSPO ontology).
- Submitted a patent as the primary inventor.

Machine - Deep Learning Engineer, Researcher

Mar. 2019 – Sep. 2019

I-SENSE Group, ICCS, NTUA

Athens, Greece

- Worked on an internal project related to eye-tracking and object detection systems.
- Developed advanced Deep Learning architectures for gaze localization.
- Implemented process for GAN quality evaluation using pre-trained Deep Learning models and Random Forest classifier.
- Performed data pre-processing and manipulation for the unification of images datasets related to driving conditions.

Data Scientist

Mar. 2018 – Jul. 2018

Sentio Solutions Inc.

Athens, Greece

- Developed proprietary algorithms for signal processing of HRV, related to signal reconstruction and quality estimation.
- Created procedure for data retrieval from cloud storage space.

Education

KU Leuven

Sept. 2020 – Present

Doctor of Philosophy - PhD, Computer Science

Leuven, Belgium

- Research Areas: Natural Language Processing, Information Extraction, Continual Learning, Deep Learning
- Advisor: Prof. Marie-Francine Moens

KU Leuven

Sept. 2019 – Aug. 2020

Advanced M.Sc., Artificial Intelligence

Leuven, Belgium

- Grade: 81.17%, Magna Cum Laude - Great Distinction
- Dissertation: "Automatic artifact removal of resting-state fMRI with Deep Neural Networks.", Advisor: Prof. Sabine Van Huffel

National and Technical University of Athens

Oct. 2012 – Oct. 2018

Integrated B.Sc. & M.Sc., Electrical & Computer Engineering

Athens, Greece

- Grade: 81.8%, Great Distinction
- Concentration: Computer Science
- Dissertation: "Deep Learning Techniques for Emotion Recognition through Facial Expressions.", Advisor: Prof. Andreas-Georgios Stafylopatis

Publications and Patents

Christos Theodoropoulos, Natalia Mulligan, Thaddeus Stappenbeck, Joao H Bettencourt-Silva. **Representation Learning for Person or Entity-centric Knowledge Graphs: An Application in Healthcare.** (under review)

Christos Theodoropoulos, Natalia Mulligan, Joao H Bettencourt-Silva, Marco Luca Sbodio. **Method/System to rank and improve usage of relations in learning Multi-Relational Graphs using Graph Neural Networks.** U.S. Patent. 2023. (filed)

Christos Theodoropoulos, Marie-Francine Moens. **An Information Extraction Study: Take In Mind the Tokenization!** In Proceedings of the 13th Conference of the European Society for Fuzzy Logic and Technology (EUSFLAT). 2023. (oral)

Christos Theodoropoulos, James Henderson, Andrei C. Coman, Marie-Francine Moens. **Imposing Relation Structure in Language-Model Embeddings Using Contrastive Learning.** In Proceedings of the 25th Conference on Computational Natural Language Learning. 2021. (oral)

Christos Theodoropoulos, Christos Chatzichristos, and Sabine Van Huffel. **Automatic artifact removal of resting-state fMRI with Deep Neural Networks.** In Proceedings of the 29th European Signal Processing Conference (EUSIPCO). IEEE, 2021.

Selected Projects

Person-Centric Knowledge Graph Extraction

- Developed a data pre-processing and analysis pipeline to extract Person-Centric Knowledge Graphs in RDF format using HSPO ontology schema and MIMIC-III dataset.
- Implemented a downstream task-agnostic transformation process to create different graph versions, experiment with the level of heterogeneity, and extract Knowledge Graphs in a GNN-friendly format.
- Trained Graph Convolution/Attention Networks to solve the ICU readmission prediction task using an insufficiently large dataset (appr. 2.5K training records).

Automatic Denoising of Resting-State fMRI

- Designed and developed a Deep Learning framework using 3D CNN and LSTM layers for artifact removal of resting-state fMRI.
- Handled spatial and temporal information by implementing a weighted voting schema.
- Achieved comparable to state-of-the-art performance.

Emotion Recognition

- Manipulated video data annotated with emotion markers using Deep Learning and Transfer Learning techniques for emotion recognition through facial expressions.
- Approached the problem as classification and regression based on the emotional space (valence-arousal).

Churn Prediction

- Implemented a Machine Learning framework for churn prediction, working with official masked customer data, given by an established Greek telecommunication company.
- Experimented with different classifiers and achieved over 88% accuracy by segmenting the customers into different risk groups.

Honors and Awards

Scholarship for Ph.D. studies, FWO fellowship

KU Leuven

Sep. 2020

Scholarship for M.Sc. studies

Bodossaki Foundation

Sep. 2019

Scholarship for M.Sc. studies

Eugenides Foundation

Sep. 2019

Scholarship for B.Sc. and M.Sc. studies

Bakopouleio Foundation

Sep. 2012/2013/2014/2015/2016

Technical Skills and Talks

Programming: Python (PyTorch, PyTorch-Geometric, Scikit-learn, Huggingface, Spacy, Numpy), Matlab, C

Agile Development and Project Management: Git, JIRA, Scrum

Conference/Other Talks: Show and Tell - IBM Research '22, CoNLL '21, EUSIPCO '21

Languages: English (fluent), Greek (native)