



## PROJECT EXPERIENCE

### Self-Explanatory Multi-Variate Time Series Anomaly Detection

#### Independent Researcher

📅 Apr 2023 – Apr 2024

📍 McGill University, iSMART Lab

- Focusing on incorporating self-explanatory principles into the field of multi-variate time series anomaly detection
- Collaborating closely with researchers at the iSMART Lab to leverage their expertise in time series analysis, creating innovative solutions
- Exploring collaborations to develop cutting-edge, explainable anomaly detection models with real-world applications

### Exploring Language-Motion Integration for Motion Editing

#### Project Leader & Supervisor of MSc Thesis

📅 Oct 2022 – Jun 2023

📍 University of Copenhagen

- Led and supervised an MSc Thesis project of efficient motion editing using multimodal generative AI and Large Language Models (LLM)
- Guided the investigation of self-supervised 3D motion generation and editing techniques, including latent space exploration and instruction-based editing
- Inspired the students to employ a Prompt-to-Prompt approach to manipulate attention maps during the diffusion process, maintaining motion similarity while enabling efficient motion editing without retraining or additional data
- Coordinated and led discussions and facilitated interactions among the research team, industrial partners, and professors, resulting in the highest grade (12/12) in their thesis

### Exploring Explainable AI for Chest X-Ray Interpretation

#### Co-supervisor of MSc Thesis

📅 Jan 2023 – Sep 2023

📍 University of Copenhagen

- Collaborated closely with professors and radiologists on the crucial intersection of medical imaging and Explainable AI
- Guided the implementation of a comprehensive XAI pipeline, incorporating visual, example-based, and textual explanations
- Facilitated discussions between the research team, radiologists, and professors, fostering effective communication and collaboration
- Received the highest grade (12/12) for the project, contributing insights into XAI's potential in medical imaging

### Data-/Annotation-Efficient Self-Explanatory Lung Nodule Diagnosis

#### Independent Researcher

📅 Jul 2021 – Oct 2022

📍 University of Copenhagen

- Introduced self-supervised contrastive learning to significantly reduce annotation requirements, enabling competitive malignancy prediction with only 1% of annotations
- Extended the capabilities of the proposed method by conducting semi-supervised active learning in the learned space, achieving even more robust and accurate diagnosis with 10x fewer annotations
- Demonstrated effective collaboration and communication skills while working closely with radiologists to incorporate their clinical expertise into the development process

## EDUCATION

### Graduate Research Trainee

#### McGill University, Canada

📅 Apr 2023 – Apr 2024

🏢 Dept of Electrical and Computer Engineering

### PhD in Computer Science

#### University of Copenhagen, Denmark

📅 Apr 2021 – Apr 2024

🏢 Dept of Computer Science

### MSc in Computational Science

#### Uppsala University, Sweden

📅 Sep 2018 – Nov 2020

🏢 Dept of Information Technology

- Anders Wall Scholarship
- 100% tuition fee waived
- GPA: 4.8/5.0

### PhD Student in Medical Imaging

#### Peking University, China

📅 Sep 2017 – Jul 2018

🏢 Dept of Biomedical Engineering

- National Doctoral Examination exempt direct admission
- Uncompleted (voluntary withdrawal)

### Exchange Student in Physics

#### Uppsala University, Sweden

📅 Aug 2015 – Jan 2016

🏢 Dept of Physics and Astronomy

- GPA: 4.8/5.0

### BSc in Applied Physics

#### Beihang University, China

📅 Sep 2013 – Jun 2017

🏢 School of Physics

- Admitted at the top 0.2% in the National College Entrance Examination
- Major GPA: 3.9/4.0

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## Multimodal Biomedical Image Registration

### MSc Thesis at MIDA Group

📅 Sep 2019 – Oct 2020

📍 Uppsala University

- Investigated the use of modern Image-to-Image (I2I) translation methods for multimodal image registration
- Implemented and evaluated four GAN-based I2I translation methods and a contrastive representation learning method on diverse multimodal datasets
- Published findings in a journal article, highlighting the strengths and limitations of I2I translation for multimodal image registration

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## Efficient Oral Cancer Screening on Whole Slide Images

### Research Project at MIDA Group

📅 Mar 2019 – Oct 2019

📍 Uppsala University

- Developed and implemented independently a fully automated end-to-end deep learning pipeline, reducing human bias and workload while enhancing classification reliability
- Proposed the per-cell focus selection module that improves accuracy of EMBM from 0.48 to 0.84 (comparable to human expert performance), with an impressive 8,491x speedup at 0.80 accuracy

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## Applet for University Autonomous Admission Simulation

### Algorithm Engineer & Product Manager

📅 Jul 2018 – Aug 2018

📍 Qingliu EdTech Group

- Designed independently the core algorithm based on Decision Tree for the recommendation and probability computing
- Conducted comprehensive product and market research, along with requirements analysis, resulting in the development of a highly competitive product
- Collaborated effectively with front-end programmers and data engineers to bring the product to fruition

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## SELECTED PUBLICATIONS

Full list at: [ludles.github.io/publications](https://ludles.github.io/publications)

- J. Lu, C. Yin, K. Erleben, M. B. Nielsen, and S. Darkner. "cRedAnno+: Annotation Exploitation in Self-Explanatory Lung Nodule Diagnosis," *IEEE International Symposium on Biomedical Imaging (ISBI)*, 2023. DOI: 10.1109/ISBI53787.2023.10230720.
- J. Lu, C. Yin, O. Krause, K. Erleben, M. B. Nielsen, and S. Darkner. "Reducing Annotation Need in Self-Explanatory Models for Lung Nodule Diagnosis," *Workshop on Interpretability of Machine Intelligence in Medical Image Computing (iMIMIC) at MICCAI*, 2022. DOI: [https://doi.org/10.1007/978-3-031-17976-1\\_4](https://doi.org/10.1007/978-3-031-17976-1_4).
- J. Lu, J. Öfverstedt, J. Lindblad, and N. Sladoje. "Is Image-to-Image Translation the Panacea for Multimodal Image Registration? A Comparative Study," *PLOS ONE*, 2022. DOI: 10.1371/journal.pone.0276196.
- J. Lu, N. Sladoje, C. R. Stark, E. D. Ramqvist, J. M. Hirsch, and J. Lindblad. "A Deep Learning based Pipeline for Efficient Oral Cancer Screening on Whole Slide Images," *International Conference on Image Analysis and Recognition (ICIAR)*, 2020. DOI: 10.1007/978-3-030-50516-5\_22.
- N. Pielawski, E. Wetzer, J. Öfverstedt, J. Lu, C. Wählby, J. Lindblad, N. Sladoje. "CoMIR: Contrastive Multimodal Image Representation for Registration", *Advances in Neural Information Processing Systems (NeurIPS)*, 2020. Preprint at arXiv:2006.06325.

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## SKILLS

### • Deep learning

PyTorch TensorFlow Keras

### • Programming

Python C MATLAB Shell

### • High performance computing

POSIX Threads MPI OpenMP

### • Academic skills and professional tools

Linux  $\LaTeX$  Zotero EndNote

Markdown ImageJ SolidWorks

ParaView GATE ROOT

### • Data engineering

SQL Spark Hive Hadoop

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## LANGUAGES

English



French



Chinese



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## TEACHING

### Signal and Image Processing

#### Teaching Assistant

📅 Spring 2022 - Spring 2024

📍 University of Copenhagen, Denmark

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### Advanced Topics in Image Analysis

#### Project Supervisor

📅 Autumn 2022

📍 University of Copenhagen, Denmark

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### Database Design

#### Teaching Assistant

📅 Autumn 2019

📍 Uppsala University, Sweden