Tom Maye-Lasserre

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Application for research internship in AI for biomedical applications

Profile

Final-year French MSc student at Ecole Centrale Nantes, I specialized in biomedical with AI and pursued mathematics to build a strong theoretical background for research. I believe that AI for biomedical applications will be most useful in revolutionizing healthcare and improving patient outcomes. I am pursuing a research career in AI for biomedical and aim to do a PhD. To begin this journey, I am looking for a 6-month research internship from April to September 2025.

Education

Ecole Centrale Nantes Nantes, France

Master of Science in Engineering *2022 – Present*

- 3rd year (Mathematics and Applications): fundamental mathematics, probability, statistics, statistical learning theory, deep learning.
- 2nd year (Signal & Image Processing, AI, biomedical applications): image/signal processing, biomedical imaging, data analysis, AI for biomedical data, segmentation, biomedical courses + applications (EEG, cancer, MRI signals, brain imaging data).
- Research-oriented track: reading/presenting scientific papers, summarizing state-of-the-art methods.

Pre-Engineering Studies: PCSI/PC* - Lycée Louis Barthou Pau, France

Preparatory Classes for Engineering Schools *2019 – 2022*

- Advanced courses in fundamental mathematics, linear algebra, physics, and computing.
- Ranked 1st out of 32 students.

Experience

Internship: AI R&D for Signal Processing April – August 2024

Thales *Brest, France*

- Collected and pre-processed time series and image signals using spatial and frequency analysis (Wigner-Ville transformation).
- Implemented Gaussian Processes, LSTM, CNNs, and Transformers.
- Enhanced interpretability using techniques for CNNs (Grad-CAM) and Transformers.
- Handled GPU-accelerated training with CUDA; initiated a conference paper.

Cancer Detection in Mammographic Images with Deep Learning October 2023 – March 2024

Hera-Mi (Research Project with PhD Collaboration) *Nantes, France*

- Implemented a combination of graph-based approaches and Transformers for classifying mammographic images, aiming to enhance detection accuracy and interpretability.
- Implemented models including ResNet and classical CNNs as baseline architectures for comparison, showing better performance using our graph-transformer model.
- Enhanced interpretability using a combination of graphs and Transformer node choices, allowing the localization and explanation of model predictions.
- Compiled and presented a preliminary research paper and presentation to our class, summarizing our work.

Internship: Computer Vision for Sports Refereeing July – August 2023

ST37 Startup *Gan, France*

- Developed a Python-based tablet application to control camera angles for real-time video refereeing in fencing and water polo.
- Image pre processing (Sobel filter, data augmentation, homography...)
- Implemented computer vision to track player movements (ResNet)

School projects

- **Cell Image Segmentation (2024):**
  - Applied image processing techniques (thresholding, edge detection, and morphological operations) for cellular image segmentation.
  - Used deep learning models, including U-Net and CNNs, to improve the accuracy of cell detection and boundary delineation.
  - Preprocessed images with noise reduction and normalization to enhance segmentation performance.
  - Evaluated the model using metrics such as IoU (Intersection over Union) and Dice coefficient to measure segmentation quality.
- **EEG Signal Analysis for Mental State Detection (2023):**
  - Analyzed EEG signals to classify mental states (e.g., relaxation, focus, drowsiness).
  - Applied signal processing techniques such as filtering, feature extraction, and wavelet transform.
  - Used machine learning models (SVM, CNN) to improve classification accuracy.

Personal Projects

- **Wikitok (2023 – Present):**
  - Developed a TikTok-style learning app using NLP and LLMs on Wikipedia data for personalized content recommendations.
- **Chess Vision AI (2023):**
  - Recognized chess pieces in live video streams and recommended optimal moves via fine-tuned neural networks.
- **French Election Bot (2022):**
  - Built a neutral chatbot using Retrieval-Augmented Generation (RAG) and LLMs to clarify political party proposals.
- **AI Models from Scratch (2022):**
  - Implemented CNN, RNN, and Transformer architectures manually to solidify deep learning fundamentals.

Skills

- Programming: Python (PyTorch, TensorFlow, Scikit-learn), MATLAB, R, LaTeX
- Frameworks/Tools: CUDA, Git, Hugging Face
- Languages: French (Native), English (Professional), Spanish (Intermediate)

Interests

- Basketball: 14 years, departmental level
- Guitar: 6 years of practice
- Chess: 1500 Elo rating
- Robotics Club: Built/programmed a radio-controlled submarine
- Tutoring preparatory students in mathematics and physics