Amine MANSOURI, Ph.D

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Education

2021 – 2024 **Ph.D., University of Burgundy, ImViA Laboratory**. In Instrumentation and Image Computing (Computer Vision).
Thesis title: *Supervision and Movement Analysis Using a Network of Smart Sensors, Application to Functional Rehabilitation.*
Thesis supervison: Prof. Toufik BAKIR.
Jury: • Prof. Pierre GOUTON • Prof. Camel TANOUGAST • Prof. Cédric KILLIAN • Prof. Choubeila MAAOUI

2020–2021 **Master's degree, University of Burgundy**. In Image and Vision (TSI).
Ranked 3/12.

2019–2020 **Master 1, University of Burgundy**. In Electronics, Signal, and Image (EEA/TSI).
Ranked 3/36.

2018–2019 **Bachelor's degree, University of Burgundy**. In Electronics (EEA).
Ranked 1/30.

2017–2018 **Master 1, University USTHB**. In Industrial Automation and Process.

2016–2017 **Bachelor's degree, University USTHB**. In Control Systems (Automation) and Electronics.

Research Section

Research Topics

• **PhD Thesis, ImViA Lab:** My research focuses on Human Action Recognition (HAR) based on skeleton data analysis and model optimization for real-time processing. I designed SIRFusion, a model that fuses 3D skeletal data and infrared video sequences to improve action recognition accuracy. For FPGA implementation, I developed ImpSGN, a lighter model using adaptive GCNs, optimized for learning parameters. Finally, I proposed ResGCN-T, an architecture combining GCN and CNN, specifically designed for efficient execution on FPGA via Xilinx Vitis-AI. My work combines modality fusion, model complexity reduction, and deployment on embedded platforms, with special attention to performance optimization between FPGA, CPU and GPU.
• **ATER, ICMUB CNRS Lab:** My research focuses on image processing and artificial intelligence applied to medical imaging, within the framework of European and ANR projects. I contributed to the development of organ and tumor segmentation algorithms incorporating physical priors to improve model robustness. In particular, I'm developing a segmentation architecture based on the Mamba SSM (State Space Models) concept, which is the subject of a journal article currently in preparation. The current project involves implementing and optimizing neural networks in Python with PyTorch/TensorFlow, leveraging my expertise in deep learning and medical image analysis.

Journal Articles

1. A. Mansouri, F. Meriaudeau, and A. Lalande, "Hv-octamamba: A high-order vision mamba network for robust retinal vasculature segmentation in octa images," *Journal paper. Paper in writing process*, 2025.
2. A. El Zaar, N. Benaya, T. Bakir, A. Mansouri, and A. El Allati, "Prediction of us 30-years-treasury-bonds movement and trading entry point using the robust 1dcnn-bilstm-xgboost algorithm," *Expert Systems*, vol. 41, no. 1, e13459, 2024.
3. A. Mansouri, T. Bakir, and A. Elzaar, "Improved semantic-guided network for skeleton-based action recognition," *Journal of Visual Communication and Image Representation*, vol. 104, p. 104 281, 2024.
4. A. Mansouri, A. Elzaar, M. Madani, and T. Bakir, "Design and hardware implementation of cnn-gcn model for skeleton-based human action recognition," *WSEAS Transactions on Computer Research (paper presented in IEEE CSCC conference)*, vol. 12, pp. 318–327, 2024.
5. A. Mansouri, T. Bakir, and S. Femmam, "Human action recognition with skeleton and infrared fusion model," *Journal of Image and Graphics*, vol. 11, no. 4, pp. 309–320, 2023.

Conference Proceedings

1. A. Mansouri, T. Bakir, and A. Elzaar, "Gcn-mamba: A semantic-guided graph convolutional network with mamba state space models for skeleton-based action recognition," in *International Conference on Control, Automation, Robotics and Vision Engineering (ICCARVE)*, 3-04/03/2025, Presented.
2. A. Mansouri, T. Bakir, and A. Elzaar, "Impsgnv2: Improved semantic-guided network with attention-based graph convolution (gcns) for skeleton-based action recognition," in *2025 International Conference on Control, Automation and Diagnosis (ICCAD)*, IEEE, 1-03/07/2025, Accepted.
3. A. El Zaar, A. Mansouri, N. Benaya, A. El Allati, and T. Bakir, "A contribution to time series analysis and forecasting using deep learning approaches," in *2024 International Conference on Control, Automation and Diagnosis (ICCAD)*, IEEE, 2024, pp. 1–6.
4. P. Foucher, R. Le, A. Mansouri, X. Dérobert, and C. Fauchard, "Concrete structure inspection based on deep learning approaches from visible and radar images," in *Sixteenth International Conference on Quality Control by Artificial Vision*, SPIE, vol. 12749, 2023, pp. 80–85.

Teaching Experience

Teaching Assistant, ICMUB CNRS Laboratory

Year	Course	Level	Type	Hours
2024 – 2025	Analog and Digital Electronics (Elec1A)	1st Year	Lab	80h
	Analog and Digital Electronics (Elec2A)	1st Year	Lab	80h
	Analog and Digital Electronics (Elec1B)	1st Year	Tutorial	18h
	Analog and Digital Electronics (Elec1B)	1st Year	Lab	60h
	Signal Processing	3rd Year	Lab	24h
	TSI Image Vision - Medical Imaging	Master's	Tutorial	8h
	TSI Image Vision - Multispectral Imaging	Master's	Lab	18h

Adjunct Lecturer, IEM Department, ImViA Laboratory

Year	Course	Level	Type	Hours
2023 – 2024	Analog and Digital Electronics (Elec1A)	1st Year	Lab	18h
	Engineering Sciences (ScIn)	1st Year	Lab	20h
	Control System	3rd Year	Tutorial	12h
	Medical Imaging	Master's	Tutorial	8h
	Multispectral Imaging	Master's	Lab	18h
2022 – 2023	Analog and Digital Electronics (Elec1A)	1st Year	Lab	48h
	Control System	3rd Year	Tutorial	12h
	Signal Processing	3rd Year	Lab	12h
	Multispectral Imaging	Master's	Lab	18h
2021 – 2022	Analog and Digital Electronics (Elec1A)	1st Year	Lab	48h
	Control System	3rd Year	Tutorial	24h
	Signal Processing	3rd Year	Lab	12h

Professional Experience

2024 – 2025 **Temporary Teaching and Research Associate (ATER)**. ICMUB CNRS Laboratory, IEM Department, University of Burgundy. Full-time contract (100%).

2021 – 2024 **Adjunct Lecturer - University of Burgundy**. Computer Science, Electronics and Mechanical Engineering Department (IEM), ImViA Laboratory.

2020–2021 **CEREMA-Strasbourg**. Integration of image and radar data for assisted inspection of civil engineering structures using supervised learning methods (multimodal and multi-view approaches):
- Conducted research on data fusion techniques for structural health monitoring.
- Developed deep learning models for anomaly detection in infrastructure inspection.
- Implemented and tested supervised learning algorithms on real-world datasets.

2017 – 2018 **CABEL, Electrical Wiring Company**. Industrial Process Observation and Control Systems:
- Gained hands-on experience in industrial wiring and electrical control systems.
- Observed and analyzed manufacturing processes for efficiency improvements.
- Assisted engineers in system diagnostics and troubleshooting.

Miscellaneous Experience

Certification

2022 **Computer Vision and Machine Learning (CVML) Courses**. Mines ParisTech University.

LabVIEW Training. University of Besançon.

2023 **Machine Learning by Practice (MLBP)**. UTBM Montbéliard University.

2024 **NLP with Transformers in Python**. Udemy.

Miscellaneous

- **Reviewer:** Elsevier (Image and Vision Computing), WSEAS Journals.
- **Supervision:** Co-supervision of engineering students' final projects in computer vision.
- **Examination:** Exam proctoring and continuous assessments.

Miscellaneous Experience (continued)

- **Assessment:** Design of continuous assessment materials for 3rd Year Control System module, including proctoring and grading.
- **Committee Participation:** Member of evaluation committees for: • Master's TSI (Image & Vision) program • 3rd Year SPI Electronics program • Master's TSI internship defenses • M2 TSI curriculum development council

Skills

Languages	Proficiency in reading, writing and speaking French (TCF, C1), English (TOEIC, 845/990) and Arabic (NATIVE LANGUAGE).
Programming	Python, PyTorch/TensorFlow, MATLAB, C/C++, VHDL, Xilinx-Vitis-AI, Assembly, Ladder, LaTeX, …
Software	Anaconda, NI LabVIEW, NI Multisim, MPLAB, Vivado/FPGA, Proteus, TIA Portal, Arduino/microcontrollers, Raspberry Pi, Mentor Graphics, …
Cloud Computing	CCUB (University of Burgundy Computing Center), Google Colab, AWS SageMaker AI, Vast.ai, Kaggle notebooks.

References

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