Lucia Migliorelli, Ph.D.

Work Experience

March 2022 – present

Postdoctoral Researcher
Università Politecnica delle Marche
Department of Information Engineering

May 2021 – present

Co-Founder of AIDAPT S.r.l
Ancona (Italy)

Education

November 2018 – October 2021

European Ph.D. in Information Engineering cum Laude
Curriculum: Computer, Management and Automation Engineering
Department of Information Enginering (Università Politecnica delle Marche)
Thesis title: *Towards digital patient monitoring: deep learning methods for the analysis of multimedia data from the actual clinical practice*
Supervisors: *Prof. Emanuele Frontoni, Sara Moccia, Ph.D*

September 2016 – October 2018

M.Sc. Biomedical Engineering cum Laude
Università Politecnica delle Marche
Thesis title: *A learning-based model for patient-specific monitoring of glucose levels: advanced methods for the analysis of heterogeneous data to control biomedical parameters*

September 2012 – July 2016

B.Sc. Biomedical Engineering
Università Politecnica delle Marche
Thesis title: *Sviluppo di una Interfaccia Grafica Utente per l'applicazione CaRiSMA (Cardiac Risk Self Monitoring Assessment)*

Teaching assignments

March 2023– present

Course owner of Computer Vision e Deep learning (9 ECTS)
Università Politecnica delle Marche
MSc in Computer and Automation Engineering

Jul 2023

Course owner of Machine Learning and Deep Learning: Methods and Applications in Bioinformatics (3 ECTS)
Università Politecnica delle Marche
PhD Course in Agricultural, Food and Environmental Sciences

January 2023– present

Adjunct Professor of Intelligenza Artificiale e Salute dell'Uomo (4 ECTS)
Università Telematica San Raffaele
MSc in Management and Business Consulting address Economics and Management of Healthcare and Technological Innovation

Abroad Research

May 2020 – September 2020   **Visiting Ph.D. Student**
Department of Electrónica Industrial (Universidade do Minho, Braga, Portugal)
Supervisor: *Prof. Cristina Peixoto Santos*

Research Assignments

May 2022   **Co-organizer**
AI-Care: Artificial Intelligence for preterm infants' healthCare workshop
In conjunction with the 21st International Conference on Image Analysis and Processing
https://sites.google.com/view/ai-care/home?authuser=0

April 2022   **Technical Program Committee**
ICTS4eHealth: 2nd Edition of the IEEE Conference on ICT Solutions for eHealth
In conjunction with the 27th IEEE Symposium on Computers and Communications
https://icts4ehealth.icar.cnr.it/

Invited speaker at national and international events

August 2023   **Invited speaker**
Symposium of Speech Science for Healthcare Applications: Databases and Technologies to Support and Restore Speech Functions
45th Annual International Conference of the IEEE Engineering in Medicine and Biology Society
Sydney (Australia)

Experience as reviewer for journal articles

2021-present   **Reviewer for Multimedia Tools and Applications (Springer Nature)**
25 completed assignments

Reviewer for Expert Systems with Applications (Elsevier)
16 completed assignments

Reviewer for Medical & Biological Engineering & Computing (Springer)
7 completed assignments

Research Publications

Journal Articles

1. Berardini, D., **Migliorelli**, L., Galdelli, A., Frontoni, E., Mancini, A., & Moccia, S. (2023). A deep-learning framework running on edge devices for handgun and knife detection from indoor video-surveillance cameras. *Multimedia Tools and Applications*, 1–19.

2. Gonçalves, C., Lopes, J. M., Moccia, S., Berardini, D., **Migliorelli**, L., & Santos, C. P. (2023). Deep learning-based approaches for human motion decoding in smart walkers for rehabilitation. *Expert Systems with Applications*, 120288.

3   **Migliorelli**, L., Berardini, D., Cela, K., Coccia, M., Villani, L., Frontoni, E., & Moccia, S. (2023). A store-and-forward cloud-based telemonitoring system for automatic assessing dysarthria evolution in neurological diseases from video-recording analysis. *Computers in Biology and Medicine*, 107194.

4   **Migliorelli**, L., Cacciatore, A., Ottaviani, V., Berardini, D., Dellaca', R. L., Frontoni, E., & Moccia, S. (2023). Twineda: A sustainable deep-learning approach for limb-position estimation in preterm infants' depth images. *Medical & Biological Engineering & Computing*, *61*(2), 387–397.

5   **Migliorelli**, L., Massini, L. S., Coccia, M., Villani, L., Frontoni, E., & Squartini, S. (2023). A deep learning-based telemonitoring application to automatically assess oral diadochokinesis in patients with bulbar amyotrophic lateral sclerosis. *Computer Methods and Programs in Biomedicine*, 107840.

6   Cannata, G. P., **Migliorelli**, L., Mancini, A., Frontoni, E., Pietrini, R., & Moccia, S. (2022). Generating depth images of preterm infants in given poses using gans. *Computer Methods and Programs in Biomedicine*, *225*, 107057.

7   **Migliorelli**, L., Frontoni, E., & Moccia, S. (2022). An accurate estimation of preterm infants' limb pose from depth images using deep neural networks with densely connected atrous spatial convolutions. *Expert Systems with Applications*, 117458.

8   Casaccia, S., Naccarelli, R., Moccia, S., **Migliorelli**, L., Frontoni, E., & Revel, G. M. (2021). Development of a measurement setup to detect the level of physical activity and social distancing of ageing people in a social garden during covid-19 pandemic. *Measurement*, *184*, 109946.

9   Montomoli, J., Romeo, L., Moccia, S., Bernardini, M., **Migliorelli**, L., Berardini, D., … Garcia, P. D. W. et al. (2021). Machine learning using the extreme gradient boosting (xgboost) algorithm predicts 5-day delta of sofa score at icu admission in covid-19 patients. *Journal of Intensive Medicine*, *1*(02), 110–116.

10   Palermo, M., Moccia, S., **Migliorelli**, L., Frontoni, E., & Santos, C. P. (2021). Real-time human pose estimation on a smart walker using convolutional neural networks. *Expert Systems with Applications*, *184*, 115498.

11   Salati, M., **Migliorelli**, L., Moccia, S., Andolfi, M., Roncon, A., Guiducci, G. M., … Refai, M. (2021). A machine learning approach for postoperative outcome prediction: Surgical data science application in a thoracic surgery setting. *World Journal of Surgery*, *45*(5), 1585–1594.

12   Antognoli, L., Moccia, S., **Migliorelli**, L., Casaccia, S., Scalise, L., & Frontoni, E. (2020). Heartbeat detection by laser doppler vibrometry and machine learning. *Sensors*, *20*(18), 5362.

13   Berardini, D., Moccia, S., **Migliorelli**, L., Pacifici, I., di Massimo, P., Paolanti, M., & Frontoni, E. (2020). Fall detection for elderly-people monitoring using learned features and recurrent neural networks. *Experimental Results*, *1*.

14   Frontoni, E., Romeo, L., Bernardini, M., Moccia, S., **Migliorelli**, L., Paolanti, M., … Zingaretti, P. (2020). A decision support system for diabetes chronic care models based on general practitioner engagement and ehr data sharing. *IEEE Journal of Translational Engineering in Health and Medicine*, *8*, 1–12.

15   **Migliorelli**, L., Moccia, S., Pietrini, R., Carnielli, V. P., & Frontoni, E. (2020). The babypose dataset. *Data in brief*, *33*, 106329.

16   Calamanti, C., Moccia, S., **Migliorelli**, L., Paolanti, M., & Frontoni, E. (2019). Learning-based screening of endothelial dysfunction from photoplethysmographic signals. *Electronics*, *8*(3), 271.

17   Agostinelli, A., Morettini, M., Sbrollini, A., Maranesi, E., **Migliorelli**, L., Di Nardo, F., … Burattini, L. (2017). Carisma 1.0: Cardiac risk self-monitoring assessment. *The Open Sports Sciences Journal*, *10*(1).

Conference Proceedings

1   **Migliorelli**, L., Alborino, F., Coccia, M., Villani, L., Frontoni, E., & Moccia, S. (accepted). End-to-end facial landmark detection to characterise oro-facial impairments in neurological patients: Towards

innovative techniques for the assessment of dysarthria. In *17th international conference on computational intelligence methods for bioinformatics and biostatistics*.

2. **Migliorelli**, L., Moccia, S., Berardini, D., Coccia, M., Villani, L., Frontoni, E., & Bandini, A. (Accepted). A preliminary study on self-care telemonitoring of dysarthria in spinal muscular atrophy. In *2023 45th annual international conference of the ieee engineering in medicine & biology society (embc)*. IEEE.

3. Cantarini, M., Gabrielli, L., **Migliorelli**, L., Mancini, A., & Squartini, S. (2023). Beware the sirens: Prototyping an emergency vehicle detection system for smart cars. In *Applied intelligence and informatics: Second international conference, aii 2022, reggio calabria, italy, september 1–3, 2022, proceedings* (pp. 437–451). Springer.

4. Cacciatore, A., **Migliorelli**, L., Berardini, D., Tiribelli, S., Pigliapoco, S., & Moccia, S. (2022). Some ethical remarks on deep learning-based movements monitoring for preterm infants: Green ai or red ai? In *International conference on image analysis and processing* (pp. 165–175). Springer.

5. Carbonari, M., Vallasciani, G., **Migliorelli**, L., Frontoni, E., & Moccia, S. (2021). End-to-end semantic joint detection and limb-pose estimation from depth images of preterm infants in nicus. In *2021 ieee symposium on computers and communications (iscc)* (pp. 1–6). IEEE.

6. **Migliorelli**, L., Berardini, D., Rossini, F., Frontoni, E., Carnielli, V., & Moccia, S. (2021). Asymmetric three-dimensional convolutions for preterm infants' pose estimation. In *2021 43rd annual international conference of the ieee engineering in medicine & biology society (embc)* (pp. 3021–3024). IEEE.

7. **Migliorelli**, L., Frontoni, E., Appugliese, S., Cannata, G. P., Carnielli, V., & Moccia, S. (2021). Improving preterm infants' joint detection in depth images via dense convolutional neural networks. In *2021 43rd annual international conference of the ieee engineering in medicine & biology society (embc)* (pp. 3013–3016). IEEE.

8. Berardini, D., **Migliorelli**, L., Moccia, S., Naldini, M., De Angelis, G., & Frontoni, E. (2020). Evaluating the autonomy of children with autism spectrum disorder in washing hands: A deep-learning approach. In *2020 ieee symposium on computers and communications (iscc)* (pp. 1–7). IEEE.

9. Bernardini, M., Ferri, A., **Migliorelli**, L., Moccia, S., Romeo, L., Silvestri, S., … Mancini, A. (2019). Augmented microscopy for dna damage quantification: A machine learning tool for environmental, medical and health sciences. In *International design engineering technical conferences and computers and information in engineering conference* (Vol. 59292, V009T12A003). American Society of Mechanical Engineers.

10. **Migliorelli**, L., Cenci, A., Bernardini, M., Romeo, L., Moccia, S., & Zingaretti, P. (2019). A cloud-based healthcare infrastructure for neonatal intensive-care units. In *International design engineering technical conferences and computers and information in engineering conference* (Vol. 59292, V009T12A009). American Society of Mechanical Engineers.

11. **Migliorelli**, L., Moccia, S., Avellino, I., Fiorentino, M. C., & Frontoni, E. (2019). Mydi application: Towards automatic activity annotation of young patients with type 1 diabetes. In *2019 ieee 23rd international symposium on consumer technologies (isct)* (pp. 220–224). IEEE.

12. Moccia, S., **Migliorelli**, L., Pietrini, R., & Frontoni, E. (2019). Preterm infants' limb-pose estimation from depth images using convolutional neural networks. In *2019 ieee conference on computational intelligence in bioinformatics and computational biology (cibcb)* (pp. 1–7). IEEE.

Books and Chapters

1. Moccia, S., Romeo, L., **Migliorelli**, L., Frontoni, E., & Zingaretti, P. (2020). Supervised cnn strategies for optical image segmentation and classification in interventional medicine. In *Deep learners and deep learner descriptors for medical applications* (pp. 213–236). Springer, Cham.

Skills

Languages	◼	Native language Italian.
		Reading, writing and speaking competencies for English.
Coding	◼	Python, MatLab, C, LaTeX.
Miscellaneous	◼	Academic research, teaching, training, consultation, LaTeX typesetting and publishing.

Miscellaneous Experience

Team awards

December 2020	◼	Ecapital Business Plan Competition. 20.000 euro.
November 2020	◼	Italian Society of Neurology, Call topic: *How the model of access to care for the neurological patient is evolving in the post Covid-19 era*. 20.000 euro.
October 2020	◼	The Microsoft Grant Award: AI for Health COVID-19.
February 2020	◼	Milan Critical Care Datathon.
November 2019	◼	B-Pioneers: Biogen SMA Hackathon. 20.000 euro.
May 2019	◼	Mastertech: Var Group Hackathon. 20.000 euro.

Supervised Students

Davide Lillini, *M.Sc. in Electronic Engineering (Università Politecnica delle Marche).*

Luigi Smargiassi, *B.Sc. in Computer, Management and Automation Engineering (Università Politecnica delle Marche).*

Chiara Baldini, *M.Sc. in Biomedical Engineering cum Laude (Università di Pisa).*

Francesco Alborino, *M.Sc. in Computer, Management and Automation Engineering cum Laude (Università Politecnica delle Marche).*

Kevin Cela, *M.Sc. in Computer, Management and Automation Engineering cum Laude (Università Politecnica delle Marche).*

Lorenzo Scoppolini Massini, *M.Sc. in Computer, Management and Automation Engineering cum Laude (Università Politecnica delle Marche).*

Greta Vallasciani, *M.Sc. in Biomedical Engineering cum Laude (Università Politecnica delle Marche).*

Alessandro Cacciatore, *M.Sc. in Biomedical Engineering (Politecnico di Milano).*

Outreach activities and STEM paths

January 2021 – May 2021	**Trainer and role model**
	Coding Girls
	Fondazione Mondo Digitale

Ancona, October 19, 2023
I authorise the processing of my data following D. Lgs. 196/03