Matteo Macchini

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Key Skills

- **ML/AI:** PhD-level proficiency in designing and implementing state-of-the-art data pipelines and ML algorithms. Specialized in computer vision, body tracking, human understanding, sequence learning, action recognition.
- **Data:** Solid knowledge in data management, experiment design, regression analysis, statistical methods.
- **Coding:** Strong programming skills in C++, C#, Python, CUDA, ML/AI development , cloud computing (GCP).
- **3D/XR:** Familiar with XR application development (Unity), skeletal animation, 3D modeling, blendshapes, rigging.
- **PM / Leadership:** Strong experience in managing AI projects end-to-end, from data collection to deployment on device and in products. Tech leading multiple cross-functional projects in the AI and XR fields. PRINCE2 certified.
- **Research:** Proven track record of conducting and publishing cutting-edge research studies for academia and industry.

Work Experience

Sep 2024 - present

Google - MagicLeap partnership (Zurich, CH) ***Staff ML/AI Engineer - Digital Humans***

- Led and shipped an open-source avatar project to showcase perception APIs.
- Spearheaded a fitness app featuring an embodied Gemini agent, demonstrating the potential of AI + XR + Body Tracking. Project shortlisted in internal 2025 efforts in audio-to-animation..
- Leading two ongoing projects on full-body pose estimation from partial body tracking and inertial sensors.

Sep 2021 - present

MagicLeap (Zurich, CH) ***Staff ML/AI Engineer - Digital Humans***

- Led a 5-engineer team to ship the core ML2 Avatars system, enabling remote collaborative experiences.
- Managed end-to-end development of multiple AI/ML projects - hand pose classification, action recognition…
- Productized key AI/ML solutions, promoting them to company-level systems for Magic Leap 2.
- Owned the Avatar system's software stack (Unity3D/C#) including data collection, networking, and animation.
- Supervised intern research projects and managed multi-functional teamalignment.

Jul 2017 - Sep 2021

EPFL (Lausanne, CH) ***Doctoral researcher - Machine Learning for Human-Robot Interaction***

- Developed beyond-state-of-art machine learning methods for body motion data processing.
- Published 7 first name peer-reviewed scientific papers in top-tier journals and international conferences.
- Teaching assistant in 6 master courses including aerial and mobile robotics, machine learning.
- Directly supervised 25+ individual semester, master, and internship projects.
- Initiated 3 international collaborations with top universities across Europe for my project.

Ref: Prof. Dario Floreano (dario.floreano@epfl.ch), Dr. Fabrizio Schiano (fabrizio.schiano@gmail.com)

Jul 2015 - Sep 2017

CERN (Geneva, CH) ***Data Analyst and Lab Coordinator***

- I led the development of an automated data analysis software, for superconducting wires diagnostics.
- Responsible of experiment scheduling based on data analysis.
- Increased laboratory efficiency: introduced automated experiments, leveraged diagnostics.
- I commissioned, tested, and installed 6 industrial furnaces.
    - Designed and implemented the corresponding acquisition and control system in LabVIEW.

Ref: Dr. Bernardo Bordini (bernardo.bordini@cern.ch)

Education

Ph.D. in Robotics, with Distinction
EPFL (Lausanne, CH)
Thesis: Wearable telerobotics: User-Adapted Interfaces for the accurate control of mobile robots

Master of Science in Automation and Robotic Engineering
Università degli studi di Pisa (Pisa, IT)
Thesis: Motion control design of a PMSM and FPGA implementation for the BWS at CERN

Bachelor's degree in Electronic Engineering
Università degli studi di Pisa (Pisa, IT)
Thesis: Digital Signal Processing for short-range distance sensors in automotive applications

Technical skills

Programming

- Programming languages and tools - excellent knowledge **(C++, C#, Python, ROS, Matlab/Simulink)**
- Programming languages - good knowledge **(LabVIEW, VHDL)**
- Version control, Issue tracking, cloud computing, virtualization **(GIT, CI/CD, Jira, GCP, Docker…)**

Data

- Data analysis, visualization, AI/ML tools **(Pandas, Numpy, Matplotlib, SKLearn, PyTorch, IPython)**
- Knowledge of natural language processing **(NLP)** and computer vision **(CV)** techniques.
- Statistical models **(normal: t-test, F-test, ANOVA, non-normal: Mann Whitney, Kruskal-Wallis, Levene…)**

3D / XR

- Experienced in the development of VR applications **(Unity3D, Blender)**
- 3D math **(rotation matrices, quaternions, Euler angles, direct/inverse kinematics, Jacobians)**
- Body Motion Capture Systems + processing **(OptiTrack/Motive, XR Devices S, Leap Motion, EMG, IMUs)**

More

- Digital Signal processing **(data compression, time-frequency analysis, FFT, system identification...)**
- Firmware/Embedded Software development **(Arduino, STM32F4, BeagleBone, Raspberry Pi, Cypress PSOC)**

Language Skills

- **Italian** - Native
- **English** - Fluent (C1)
- **French** - Fluent (B2)
- **German** - Basic (A1)

Advanced training and certifications

- **Neural Networks and Deep Learning specialization** (2022, by Coursera)
- **PRINCE2 2017 Project Management Certification** (2020, by Axelos Global Best Practice)
- **Start-Up Training - Business Concept** (2019, by INNOSUISSE - Swiss Innovation Agency)
- **International School on Human Body Motion** (2017, Heidelberg)
- **Certified LabVIEW Associate Developer - CLAD** (2016, by National Instruments)
- **FPGA Design Using VHDL - Advanced** (2015, by Doulos)

Honors & Awards

- **Best PhD Thesis Award** (EPFL, 2021)
- **Technical Student Scholarship** (CERN, 2014)
- **Top 1% student placement test** (UniPi, 2009)
- **National finalist of the national Mathematical Olympiad** (2007)

Extracurricular activities

- Passionate in reading and writing, good writing ability (technical and creative)
- Passionate in tennis, golf, boxing, piano
- National chess finalist

Scientific Activities

Selected Publications

- **M. Macchini**, F. Schiano, and D. Floreano, ***"Personalized Telerobotics by Fast Machine Learning of Body-Machine Interfaces."*** IEEE Robot. Autom. Lett. (2019)
- **M. Macchini**, T. Havy, A. Weber, F. Schiano, and D. Floreano, ***"Hand-worn Haptic Interface for Drone Teleoperation."*** IEEE Int. Conf. Robot. Autom. (2020).
- **M. Macchini**, F. Schiano and D. Floreano, ***"Data-driven personalization of body-machine interfaces to control diverse robot types"*** , IEEE Trans. Syst., Man, Cybern., IN REVIEW
- **M. Macchini**, Y. Belal, A. Giusti, G. Abbate, M. Tognon, F. Schiano, R. Siegward and D. Floreano, ***"Online Adaptation Body-Machine Interfaces Based on Classification of Body Motion Patterns"***, IEEE Trans. Syst., Man, Cybern., IN REVIEW
- **M. Macchini,** L. De Matteïs, F. Schiano, and D. Floreano, ***"Personalized Human-Swarm Interaction through Hand Motion"*** (2021) - Robot. Autom. Lett.
- **M. Macchini,** M. Lortkipanidze, F. Schiano, and D. Floreano, ***"The Impact of Virtual Reality and Viewpoints in Body Motion Based Drone Teleoperation"*** **-** IEEE VR (2021)
- **M. Macchini,** M. Frogg, F. Schiano, and D. Floreano, ***"Does spontaneous motion lead to intuitive Body-Machine Interfaces? A fitness study of different body segments for wearable telerobotics"*** **-** IEEE Intl. Conf. Rob. Hum. Inter. Comm. - RO-MAN (2021).
- J. Emery, A. Barjau, B. Dehning, J. Herranz Alvarez, P. Lapray, and **M. Macchini**. *"Design and validation methodology of the control system for a particle beam size measurement instrument at the cern laboratory."*, Am .Control. Conf. (2017)
- B. Bordini, A. Ballarino, **M. Macchini**, D. Richter, B. Sailer, M. Thoener, and K. Schlenga, ***"The bundle-barrier PIT wire developed for the HiLumi LHC project."***, IEEE Trans. Appl. Supercond. (2016)

Oral Presentations & Invited Talks

- **Open Science in Practice 2018,** *"Body Motion as data source for Telerobotics."* (Lausanne, 2017)
- **Humans in Motion 2018, "***Drone piloting through Body Motion."* (Heidelberg, 2018)
- **ICRA 2020**, *"Hand-worn Haptic Interface for Drone Teleoperation."* (Paris - online, 2020)
- **IEEE VR 2021**, *"The Impact of Virtual Reality and Viewpoints in Body Motion Based Drone Teleoperation."* (Lisbon - online, 2021)
- **IEEE Neuro-EMBS 2021**, "Personalized Body-Machine Interfaces for Advanced Human-Robot Interaction." (online, 2021)