Simone Prisinzano

BIONICS ENGINEER

Links

<u>LinkedIn</u>

<u>GitHub</u>

Projects Drive

Skills

MATLAB

С

Biomedical Robotics

Python

Data Processing & Analysis

Exoskeletons

Human-Machine Interfaces (HMI)

Machine Learning

Embedded Systems

Design of Experiments

Circuit Analysis and Signal Processing

ROS

LabView

Comsol Multiphysics

Analog & Digital Electronics

SPICE

Finite Element Method (FEM)

Blender

Statistical Data Analysis

Fast Learner

Rapid Prototyping

SOFA (Simulation Open Framework Architecture)

Assembly Language

AutoCAD

Profile

I am a Bionics Engineer with a diverse background in Robotics, biomedical engineering, and electronics, specializing in wearable robotics, including exoskeletons and prosthesis. With a strong focus on innovation and excellence, I am dedicated to advancing technologies that enhance human-machine interaction and improve quality of life. Of Sicilian origin, I am passionate about pushing the boundaries of engineering to create impactful solutions in the fields of assistive technologies and robotics.

Education

M.Sc. in Bionics Engineering, Sant'Anna School of Advanced Studies & Università di Pisa, Pisa (Italy)

OCTOBER 2021 - FEBRUARY 2025

- Bio-Robotics curriculum: focus on biomedical robotics.
- Grade: 110/110
- Experimental thesis on "Biomechanical evaluation of a novel passive lumbar exoskeleton in load lifting activities": Work-Related Musculoskeletal Disorders (WRMSDs) are a major cause of productivity loss and injury in physically demanding jobs. To address them, during this thesis I developed and executed a comprehensive biomechanical evaluation of a new passive lumbar exoskeleton, assessing its impact on muscle activation, posture, and perceived exertion during occupational lifting and stooping tasks. Designed and implemented a standardized experimental protocol involving surface EMG, IMU-based kinematic analysis, and subjective RPE assessments. Performed signal processing, statistical analysis, and data interpretation to quantify exoskeleton effectiveness in reducing lower-back strain while gaining insights on user perception.
- Other projects developed during the course:
- Two States velocity control of the Ottobock 1 DOF prostheses: Design, development, and testing of a C-based algorithm for prosthetic hand velocity control. The control algorithm employs a hysteresis-based finite state machine to regulate opening and closing speed based on forearm flexor/extensor muscle activation, detected via EMG sensors. It runs on a Microchip PIC18F microcontroller, mounted on a PCB that integrates all input/output components, facilitating signal processing, control execution, and communication with the prosthetic hand.
- 2. Design, development, and testing of neural networks that used sensor signals (PPG, load cells, temperature data) to predict the mean and standard deviation of ECG signals and classify activities (sitting, walking, running) for 22 subjects. The main objective was to develop various systems (MLP, RBF, CNN, RNN, fuzzy systems) in MATLAB and identify the network architectures that yielded the best performance.
- 3. Design of an HMI for supervised Robotic Suturing, using the Leap Motion Controller: design and development of a LabVIEW-based Human-Machine Interface (HMI) to simulate a supervised robotic suturing process. The user inputs the wound centerline path via the Leap Motion Controller hand-tracker, which is processed by LabVIEW to define the kinematic motion of the simulated Puma 560 robot.

All materials related to the mentioned projects (and more) are available at this link: bit.ly/45uX6Jc

ANSYS

Tissue Engineering

Linux OS

Microsoft Office

Adaptability

Ability to Work Under Pressure

WEKA

Languages

Italian English German

French

Hobbies

My interests are very spread: Engineering science, politics and photography/filmography but above all I love videogames since I was a child.

I am an Electronic music enthusiast a<u>s well as a sci-fi books</u>

addicted.

I spend some of my free time doing workouts, running or traveling.

B.Sc. in Electronics Engineering, University of Palermo, Palermo (Italy)

SEPTEMBER 2018 - SEPTEMBER 2021

L-8 - Laurea in Ingegneria dell'informazione

Grade: 110/110

Final thesis on "The new frontier of Spintronics: hybrid organic-inorganic perovskites": Spintronics leverages both electron charge and spin to create faster, more efficient electronics. Hybrid perovskites are particularly promising due to their long spin coherence times, tunable properties, spin control, and low-cost fabrication. This makes them ideal for advanced memory devices, spin-based transistors, and even light-powered spintronics. With these advantages, perovskites could play a key role in the future of spin-based technology.

Scientific High school diploma - Applied Science module, Liceo IIS Failla Tedaldi, Castelbuono (Italy)

SEPTEMBER 2013 - JULY 2018

Vote: 87/100

This high school path substitute usual latin teaching with more biology and computer science.

Internships

Design of a virtual simulator and evaluation with the da Vinci Research Kit (dVRK) Robot, BioRobotics Institute, Sant'Anna School of Advanced Studies, Pontedera (PI)

MAY 2023 - DECEMBER 2023

GitHub repository link: https://bit.ly/4hF1Di3

Academic internship, performed at the Surgical Robotics Lab of the Biorobotics Institute. I developed a virtual environment for simulating soft tissue robotic surgery, specifically focusing on pulmonary veins, using the da Vinci Research Kit robot (dVRK) as a testing platform for scientific evaluations. The simulation integrated SOFA to model the physical interaction between the virtual Da Vinci Gripper and the virtual pulmonary vein. I created all the 3D models from scratch in Blender, which were then incorporated into a Python-based framework that merged SOFA plugins with real-time manipulator data from ROS. This setup allowed for the simulation of vein deformation and interaction with the gripper. The overarching objective was to create a realistic training scenario for medical students and surgeons to practice and refine their surgical skills.

Skills learned: Python Programming, ROS, Object Modeling, Blender, SOFA, rapid prototyping, FEM, code optimization, Git tools.

Certificates

Foundational MATLAB

bit.ly/3WsC2Ar

EF SET English (C2 proficient) JULY 2023 bit.ly/44uzPpp

Additional courses

STMicroelectronics Webinars, STMicroelectronics - Università degli studi di Palermo

MAY 2021

Quantum Physics, Università degli studi di Palermo MARCH 2020 – JUNE 2020

Geogebra Software, Università degli studi di Palermo MAY 2019 – JUNE 2019

Extra-curricular activities

Attendee, Festival della Robotica, Pisa

MAY 2023

A robotics-centered event where I met several researchers and experts in the field. This opportunity broadened my perspectives about businesses and certification paths that revolve around bionics and robotics technology, as well as taught many stories from successful entrepreneurs.

Lectio Magistralis with Federico Faggin, inventor of the first mircroprocessor-"Intel 4004", Università degli studi di Palermo MAY 2021

Employment History

Volunteer, Ypsigrock Festival, Castelbuono (PA) AUGUST 2023

One of the most important boutique festival of Europe: this experience allowed me to practice social skills and to apply problem solving to different scenarios, from guest reception and supply planning to traffic management.

Library assistant, advertising activity and local guide, Castelbuono's Castle foundation in collaboration with "Alternanza scuola lavoro", Castelbuono(PA), Italy

2015 - 2018

Activities performed in the last 3 years of high school in the context of "School/work switching" program of the italian Government.

I have done:

-Local library assistant

-Advertising activity for local entertainment events ("online presence" building and events description)

-Local tourist guide

References

References available upon request

Privacy

In compliance with the GDPR and the Italian Legislative Decree no. 196 dated 30/06/2003, I hereby authorize you to use and process my personal details contained in this document.