



youhan li

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EDUCATION AND TRAINING

MSc in Mechanical Engineering

Sapienza University of Rome [26/09/2021 – 23/01/2025]

Country: Italy | Field(s) of study: Medical Robotics | Final grade: 104/110 | Level in EQF: EQF level 7 | Thesis: EMG-driven Nonlinear Model Predictive Control of Peak Lumbar Torque at the L5-S1 Joint Using a Joint Artificial Actuator During Upper Limb Movements

Erasmus programme (Robotics and Mechatronics)

University of Twente [03/09/2023 – 31/07/2024]

Country: Netherlands | Final grade: 9/10 | Type of credits: Project | Number of credits: 30ECT | Thesis: Lab project: EMG-driven Nonlinear Model Predictive Control of Peak Lumbar Torque at the L5-S1 Joint Using a Joint Artificial Actuator During Upper Limb Movements

BSc in Mechatronics

Chang'an University [01/09/2016 – 31/07/2021]

Country: China | Level in EQF: EQF level 6

PUBLICATIONS

[2024]

[Youhan Li, Massimo Sartori, and Mahdi Nabipour. "Towards Predictive Control of Trunk Internal Loads: Modeling Musculotendon Loads and Predicting Muscle Excitations," ICNR, 2024.](#)

- Developed a simplified back muscle model and validated it under stoop conditions (correlation > 0.98).
- MEP predictor was developed for MPC design based on stoop conditions and validated under the same conditions (correlation 0.86 ± 0.06).
- Provided a robust framework for real-time exoskeleton control and future design of MPC.

[2020]

[Youhan Li. "Research on Vibration Optimization Technology Based on Mecanum Wheel Mobile Platform," Auto Manufacturing Engineer, October 2020.](#)

PROJECTS

[20/01/2024 – Current]

***EMG-Driven Nonlinear Model Predictive Control of Peak Lumbar Torque at the L5-S1 Joint Using a Joint Artificial Actuator During Upper Limb Movements (Research - Project *MSc Thesis)**

- Developed a simplified back muscle model and validated it under stoop conditions (correlation > 0.98).
- MEP predictor was developed for MPC design based on stoop conditions and validated under the same conditions (correlation 0.86 ± 0.06).
- *Developing a nonlinear model predictive controller predictively regulates the peak lumbar torque at the L5-S1 joint of subjects performing repetitive motions while wearing an EMG-driven back-support muscle exoskeleton, thereby protecting their lower back muscles (WIP).

[01/07/2022 – 01/08/2022]

Real-Time PID Controller Design for a Self-Balancing Scooter

- Develop the balance, velocity, and rotation PID loops applied to the scooter.
- Optimize the PID parameters to improve the robot's performance.
- Integrate the Kalman filter to enhance the scooter's reliability.

Link: https://youtu.be/X1Sj8l_yIV4

[01/03/2024 – 01/05/2024]

Applying the green ball detection algorithm on the Relbot robot based on the ROS2 framework using C++

- Utilized the OpenCV library to implement color and edge detection algorithms, sending real-time position data of the green ball.
- Set up the ROS framework on the Relbot robot to track a green ball by subscribing to position data, utilizing closed-loop motor control.

[25/10/2022 – 30/11/2022]

Estimate and predict the locations of UAVs by Machine learning algorithm(classifier and regression)

- Estimated the total number of conflicts between UAVs given the provided features(UAV positions and postures) by AdaBoost Classifier (accuracy 50%).
- Predicted the minimum Closest Point of Approach(CPA) among all the possible pairs of UAVs by SVM regression.

[01/08/2024 – 24/08/2024]

Applied the YOLOv8 model to perform robot type detection on the Robomaster 2021 dataset.

- Configured the YOLOv8 environment and set key training parameters (e.g., batch size and epochs).
- The model was trained on the RoboMaster 2021 dataset and evaluated on the test set, achieving an mAP50 of 0.826.

[01/03/2022 – 01/08/2022]

Six DOF robot Manipulator motion planning (forward/inverse kinematic and dynamic)

- Derived the forward and inverse kinematics of a 6-DOF robot manipulator.
- Derived the forward and inverse dynamics of the 6-DOF robot Manipulator.
- Tracked three different trajectories and demonstrated the performance using Simulink.

SKILLS

Skills of Biomedical Engineering

Musculoskeletal Model / Model Predictive Control / CEINMS / Xsens / Opensim / twinCat / Muscle exoskeleton / Qualisys

Skills of Robotics

C++ / C / ROS / Linux / Matlab/Simulink / SolidWorks/CATIA / Python / Arduino / STM 32 / OpenCV

General Skills

Overleaf & LaTeX / CAD / CAE

WORK EXPERIENCE

 **Xi'An Transpower Hydraulic Equipment Company – Xi'An, China**

City: Xi'An | Country: China

Visiting engineer

[01/06/2019 – 01/07/2019]

- Visiting the factory production line
- Designing the hydraulic pump

LANGUAGE SKILLS

Mother tongue(s): Chinese

Other language(s): Cantonese

English

LISTENING B2 **READING** C1 **WRITING** C1

SPOKEN PRODUCTION B2 **SPOKEN INTERACTION** B2