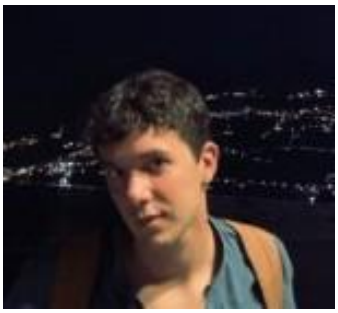

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PERSONAL INFORMARIONS

Nationality: Italian
Birth date: 12/Agosto/1996
Profession: Robotics engineer

DESCRIPTION

I'm a robotic engineer very passionate about robotics. Currently I'm a phd student at IIT, I'm working on advanced control strategies for lower limb exoskeleton in rehabilitation field with the aim of finding novel trajectory generation algorithm and assistive control strategies to improve stability and human-like walking capabilities. I like to understand how things work and what can be done to make them work better. My educational background is strongly focused on motion planning for multiple types of robots (from exoskeletons and robot manipulators to car-like robots and drones).

My main skills are the following:
- Developing motion planning algorithms and trajectory generation.
- Optimization algorithms and optimal control.
- Neural network and Fuzzy inference systems.
- Estimation, Filtering and robust control.
- Guidance and Navigation.

I have a good knowledge of the most important programming languages and tools used in robotics such as ROS, OMPL, matlab, python, java, C++, ecc.

I think a healthy lifestyle reflects positively on psychological well-being, so in my free time I play basketball and do a lot of physical activities. In addition, I have a good attitude to work in a group, a good collaboration is the basis of great results.

SPOKEN LENGUAGES

- Italian: Native speaker
- English: Advanced level
- German: scholastic level

I have a good aptitude for learning new languages

EDUCATION

BACHLEOR'S DEGREE, COMPUTER ENGINEERING (2014-2017)
Università degli studi del Sannio

- curriculum oriented to automatic controls and AI
- internship in STMicroelectronics (2016)

MASTER'S DEGREE, ROBOTICS (2018-2021)
Università di Pisa

- voting: 110/110 (maximum).
- projects focused on motion planning, optimization algorithms and machine learning

PHD, BIOENGINEERING (Present)
Politecnico di Milano

- phd project focused on trajectory generation and control of a lower limb exoskeleton for Rehabilitation

MASTER'S THESIS PROJECT

Online Motion Planning Algorithms for Car-Like Vehicles in Cluttered and Partially-known Environments (in collaboration with Örebro Universitet)

Description:

In this thesis project I propose four new replanning-based extensions of RRT* and Bi-RRT* algorithms (namely, O-RRT*, O-Bi-RRT*, D-RRT*, and D-Bi-RRT*) that refine the path periodically while the robot is in motion. The path quality vs. planning time trade-off of all proposed algorithms is evaluated against the original RRT* and Bi-RRT* algorithms in known and partially-known environments by leveraging the OMPL Library. Toward this aim, all the proposed algorithms has been integrated with an innovative online tree-root modification heuristic for a more efficient replanning, and with a non-uniform obstacle-guided sampling strategy that is particularly suitable in cluttered environments

SOFTWARE AND PRORAMMING LANGUAGES

- OMPL - ROS - Matlab - Python - C++ - C - Java - Google Colaboratory

- AcTUP - Linux - Unity - R - C# - MARS - Eclipse - html - LaTeX

RELEVANT PROJECTS

Planning and Control of a Planar Robot Manipulator.

Description:

Trajectory planning through optimal control techniques of a planar manipulator mounted on a mobile base in order to reduce the forces to which the base is subjected during the motion of the robot. Further development of track control algorithms (Computed Torque, Backstepping, Adaptive Backstepping, Partial Feedback Linearization) with relative analysis of observability and reconstructibility of the controlled system.

Fuzzy-Orizon Control System for Drone Navigation

Description:

The main objective of this project is to implement an obstacle avoidance control mode based on Fuzzy Orizon technique for a Icaro drone. Thanks to this mode the drone using a lidar sensor will be able to reach a reference position correcting in real time its one trajectory in order to avoid obstacles on the path.

Convolutional Neural Network for Medical Imaging Analysis- Abnormality detection in mammography.

Description:

In this project several CNN neural networks, pre-trained CNN and composite classifiers have been developed with the aim of creating classification models for mammographic images. Secondly, the GRAD-CAM technique was used to visualize the parts of a specific mammographic image that led CNN to its classification decision with the aim of estimating the precise position of possible tumors or calcifications.

3D Modeling of a Source-Target-Receiver Underwater System.

Description:

In this project, given a Source-Target-Receiver underwater system, the matlab Acoustic Toolbox package was used to discriminate which of the echoes arrived at the receiver came directly from the source and which came from a possible Target. Subsequently, it has proceeded in inverse way trying to reconstruct the geometry of the entire underwater system known the echoes to the receiver.

OTHER THEORETICAL KNOWLEDGE

- Sampling based Motion Planning techniques
- Combinatorial Motion Planning techniques
- Kinodynamic Motion Planning techniques
- Robot control techniques
- Robot mechanics and modelling
- Distributed robots
- Model Predictive Control
- Optimization techniques
- SLAM techniques
- Inertial Navigation, GPS system, Integrated Inertial Navigation systems
- Guidance techniques (PNG, APNG, CLOS, SNPNG, ALPHA Guidance, Waypoints Guidance, Fuzzy Guidance)
- Kalman Filter, EKF, UKF
- Dynamic systems modeling
- Digital control systems
- SISO systems control techniques
- MIMO systems control techniques
- Non-linear system control techniques
- Underwater systems
- Robust Control
- System identification