Optimization-Based Control for Robotic Manipulation: from Construction to Surgical Robots

Thanks to its predictive nature, a optimization-based control strategies are able to find optimal sets of control inputs anticipating changes within its predictive horizon. Moreover, system constraints can be explicitly considered in the formulation of the optimal control problem. This characteristic is of particular interest since the best performance is often obtained in the limits of the system capabilities. In this talk, I'll present recent results in different robotic applications in which these advantages play crucial roles, such as the control of large dimension Cable-Driven Parallel Robots and 3D robotic bio-printing.

Short bio

João Cavalcanti Santos, tenure Lecturer of robotics with University of Montpellier - France, received B.Eng. and M.Sc. degrees in mechanical engineering from the University of São Paulo - Brazil, in 2015 and 2017, respectively. He received his Ph.D. degree in 2020 from LIRMM, Montpellier, France, where he participated in the design and control of a cable-driven parallel robot in the European H2020 project Hephaestus. From 2020 to 2022, he was a Posdoctoral Fellow with INSERM in Montpellier, developing mechatronic and control solutions for surgical robots. His main research interests include robot design and control, numerical optimization, and model predictive control.