Memory of Motion

Results

Project Information

MEMMO

Grant agreement ID: 780684

Project website

DOI
10.3030/780684

Project closed

EC signature date
20 December 2017

Start date
1 January 2018

End date
30 June 2022

Funded under
INDUSTRIAL LEADERSHIP - Leadership in enabling and industrial technologies - Information and Communication Technologies (ICT)

Total cost
€ 4 157 151,75

EU contribution
€ 3 964 818,75

Coordinated by
CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS
France

CORDIS provides links to public deliverables and publications of HORIZON projects.

Links to deliverables and publications from FP7 projects, as well as links to some specific result types such as dataset and software, are dynamically retrieved from OpenAIRE.

Deliverables

Documents, reports (20)

Low-level torque and compliant control

The report will be submitted in an international conference.

State estimation

The report will describe state esimtation with multi-sensor contact and will be submitted to an international conference.

Specifications and prototype of data exchanges

Early prototype to test the bidirectional exchange of data and models between WP2 and WP1/WP3.

Hierarchy optimal control & shared autonomy

Publication submitted to peerreview journal

Rehabilitation exoskeleton showcase

Report showcases results with video and demonstrator with paraplegic patient

Multicontact manipulation benchmarks

Report and companion video of the final demonstrator Live demonstration at final review meeting

Memory of motion report : final version

Models for movement encoding and synthesis with a rich set of representation spaces in realistic setting including whole body motion subspaces and hierarchies

Feedback control in sensor space

Report on the performance of feedback control in sensor space using learned local linear models

Gaited locomotion benchmarks

Report and companion video displaying the resulting demonstrator

Specifications of the three demonstrators

Description of the 3 final setups main respective contributions of AIRBUS WAN and UEDIN

Civil engineering demonstrator

Report results of field testing of quadruped in field location specified by COSTAIN

MPC in sensor space

Open source implementation of the MPC algorithm in sensor space and scientific report on experimental results using this algorithm

Aerospace manufacturing showcase
Report showcases results with video and demonstrator in Hangar D41

Dense perception
The report will be submitted in an international journal

Memory of motion report : intermediary version
Models for movement encoding and synthesis with reduced set of representation spaces in lab setting

Whole-body balance and tooling benchmarks
Report and companion video displaying the resulting demonstrator.

Management handbook
The handbook describes the project organization, the communication procedures, the structure of deliverables and the corresponding quality procedures, the financial management.

Specifications and prototype for dense vision
This will serve as a preliminary step for D5.4.

Demonstrators and benchmarking criteria
The report will be circulated among the partners and used as guide for demonstrators implementation.

Report on Trajectory Generation
Description of the motion planner T11T12 together with their opensource implementations

Other (5)

Optimal control with warm start features
Open source software implementing state-feedback MPC.

Exoskeleton gait dataset
Dataset upon which the adaptation algorithms of T3.5 are developed and validated.

Fast optimal control resolution
Open source software implementing an efficient optimal-control solver tailored to the project robots.

Final Trajectory Datasets

Refined version of the trajectory datasets for the targeted three applications and four robots

Preliminary Locomotion Dataset

Dataset of state-control trajectories of PAL Pyr`ene performing multi-contact locomotion.

Open Research Data Pilot (1)

Data management plan

Report on how research data is handled during the project and preserved after its end.

Websites, patent fillings, videos etc. (2)

Web site of the project

Industrial workshops

Organization of a workshop to gather direct feedbacks from the enduser board

Demonstrators, pilots, prototypes (1)

Learning predictive models in sensor space

Open source software providing tools to learn predictive models in sensor space and to compute reduced generalized models using sensory features

Publications

Conference proceedings (81)

Sparsity-Inducing Optimal Control via Differential Dynamic Programming

Author(s): Dinev, Traiko; Merkt, Wolfgang; Ivan, Vladimir; Havoutis, Ioannis; Vijayakumar, Sethu

Published in: IEEE ICRA, Issue 1, 2020
Publisher: --

Online Trajectory Planning Through Combined Trajectory Optimization and Function Approximation: Application to the Exoskeleton Atalante
Author(s): Alexis Duburcq, Yann Chevaleyre, Nicolas Bredeche, Guilhem Boéris
Published in: IEEE International Conference on Robotics and Automation (ICRA), 2020, ISBN 978-1-7281-7395-5
Publisher: IEEE
DOI: 10.1109/icra40945.2020.9196633

Stochastic and Robust MPC for Bipedal Locomotion: A Comparative Study on Robustness and Performance
Author(s): Ahmad Gazar, Majid Khadiv, Andrea Del Prete, Ludovic Righetti
Published in: 2021 IEEE-RAS 18th International Conference on Humanoid Robots (Humanoids), 2021
Publisher: IEEE
DOI: 10.1109/humanoids47582.2021.9555783

Optimizing Dynamic Trajectories for Robustness to Disturbances Using Polytopic Projections
Author(s): Henrique Ferrolho, Wolfgang Merkt, Vladimir Ivan, Wouter Wolfslag, Sethu Vijayakumar
Published in: IEEE/RJS International Conference on Intelligent Robots and Systems (IROS), 2020
Publisher: Institute of Electrical and Electronics Engineers (IEEE)

Trajectory Prediction with Compressed 3D Environment Representation using Tensor Train Decomposition
Author(s): Brudermüller, L., Lembono, T.S., Shetty, S. and Calinon, S.
Published in: IEEE Intl Conf. on Advanced Robotics (ICAR), 2021
Publisher: IEEE

Modelling and Control of a Hybrid Wheeled Jumping Robot
Author(s): Traiko Dinev, Songyan Xin, Wolfgang Merkt, Vladimir Ivan, Sethu Vijayakumar
Published in: Proceedings of the 2020 IEEE/RJS International Conference on Intelligent Robots and Systems (IROS), 2020
Publisher: Institute of Electrical and Electronics Engineers (IEEE)

Estimation of Multiple Flexibilities of an Articulated System Using Inertial Measurements
Author(s): Matthieu Vigne, Antonio El Khoury, Matthieu Masselin, Florent Di Meglio, Nicolas Petit
Published in: IEEE Conference on Decision and Control (CDC), 2018, ISBN 978-1-5386-1395-5

Publisher: IEEE
DOI: 10.1109/cdc.2018.8619734

Multi-Fidelity Receding Horizon Planning for Multi-Contact Locomotion
Author(s): Jiayi Wang, Sanghyun Kim, Sethu Vijayakumar, Steve Tonneau
Published in: 2020 IEEE-RAS 20th International Conference on Humanoid Robots (Humanoids), 2021, Page(s) 53-60, ISBN 978-1-7281-9372-4
Publisher: IEEE
DOI: 10.1109/humanoids47582.2021.9555778

ICP Localization and Walking Experiments on a TALOS Humanoid Robot
Author(s): Thibaud Lasguignes, Isabelle Maroger, Maurice Fallon, Milad Ramezani, Luca Marchionni, Olivier Stasse, Nicolas Mansard, Bruno Watier
Published in: IEEE ICAR, 2021, ISBN 978-1-6654-3684-7
Publisher: IEEE
DOI: 10.1109/icar53236.2021.9659474

Design, analysis and control of the series-parallel hybrid RH5 humanoid robot
Author(s): Julian Eber; Shivesh Kumar; Heiner Peters; Vinzenz Bargsten; José de Gea Fernández; Carlos Mastalli; Olivier Stasse; Frank Kirchner
Published in: IEEE-RAS International Conference on Humanoid Robots (Humanoids), 2021
Publisher: IEEE
DOI: 10.1109/humanoids47582.2021.9555770

Comparison of predictive controllers for locomotion and balance recovery of quadruped robots
Author(s): Corbères, Thomas; Flayols, Thomas; Léziart, Pierre-Alexandre; Budhiraja, Rohan; Mansard, Nicolas
Published in: Subm to IEEE ICRA, Issue 1, 2020
Publisher: --

Rapid Stability Margin Estimation for Contact-Rich Locomotion
Author(s): Romeo Orsolino, Siddhant Gangapurwala, Oliwier Aleksander Melon, Mathieu Geisert, Ioannis Havoutis and Maurice Fallon
Published in: 2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2021, ISBN 978-1-6654-1714-3
Publisher: IEEE
DOI: 10.1109/iros51168.2021.9636474

DeepQ Stepper: A Framework for Reactive Dynamic Walking on Uneven Terrain
Author(s): Avadesh Meduri, Majid Khadiv, Ludovic Righetti
Published in: 2021 IEEE-RAS International Conference on Robotics and Automation (ICRA), 2021

Publisher: IEEE
DOI: 10.1109/icra48506.2021.9562093

Probabilistic Iterative LQR for Short Time Horizon MPC
Author(s): Lembono, Teguh Santoso; Calinon, Sylvain
Published in: Proc. IEEE/RSJ Intl Conf. on Intelligent Robots and Systems (IROS), 2021, Page(s) 556-562
Publisher: IEEE
DOI: 10.1109/iros51168.2021.9636295

Proximal and Sparse Resolution of Constrained Dynamic Equations
Author(s): Justin Carpentier; Rohan Budhiraja; Nicolas Mansard
Published in: Robotics: Science and Systems, 2021, ISBN 978-0-9923747-8-5
Publisher: RSS
DOI: 10.15607/rss.2021.xvii.017

Whole-Body End-Pose Planning for Legged Robots on Inclined Support Surfaces in Complex Environments
Author(s): Henrique Ferrolho, Wolfgang Merkt, Yiming Yang, Vladimir Ivan, Sethu Vijayakumar
Published in: 2018 IEEE-RAS 18th International Conference on Humanoid Robots (Humanoids), 2018
Publisher: IEEE
DOI: 10.1109/humanoids.2018.8625026

A Passive Navigation Planning Algorithm for Collision-free Control of Mobile Robots
Author(s): Carlo Tiseo, Vladimir Ivan, Wolfgang Merkt, Ioannis Havoutis, Michael Mistry, and Sethu Vijayakumar
Published in: 2021 IEEE International Conference on Robotics and Automation (ICRA), 2021, ISBN 978-1-7281-9077-8
Publisher: IEEE
DOI: 10.1109/icra48506.2021.9561377

iRiSC: Iterative Risk Sensitive Control for Nonlinear Systems withImperfect Observation
Author(s): Bilal Hammoud, Armand Jordana, Ludovic Righetti
Published in: American Control Conference, 2022
Publisher: IEEE

Online Dynamic Motion Planning and Control for Wheeled Biped Robots
Author(s): Songyan Xin, Sethu Vijayakumar
Published in: Proceedings of the 2020 IEEE/RJS International Conference on Intelligent Robots and Systems (IROS), 2020
Publisher: Institute of Electrical and Electronics Engineers (IEEE)

Learning a Centroidal Motion Planner for Legged Locomotion
Author(s): Julian Viereck, Ludovic Righetti
Published in: 2021 IEEE-RAS International Conference on Robotics and Automation (ICRA), 2021
Publisher: IEEE
DOI: 10.1109/icra48506.2021.9562022

Absolute humanoid localization and mapping based on IMU Lie group and fiducial markers
Author(s): Mederic Fourmy, Dinesh Atchuthan, Nicolas Mansard, Joan Sola, Thomas Flayols
Published in: 2019 IEEE-RAS 19th International Conference on Humanoid Robots (Humanoids), 2019, Page(s) 237-243, ISBN 978-1-5386-7630-1
Publisher: IEEE
DOI: 10.1109/humanoids43949.2019.9035005

Simultaneous Scene Reconstruction and Whole-Body Motion Planning for Safe Operation in Dynamic Environments
Author(s): Mark Nicholas Finean, Wolfgang Merkt, Ioannis Havoutis
Published in: 2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2021, ISBN 978-1-6654-1714-3
Publisher: IEEE
DOI: 10.1109/iros51168.2021.9636860

SL1M: Sparse L1-norm Minimization for contact planning on uneven terrain
Author(s): Steve Tonneau, Daeun Song, Pierre Fernbach, Nicolas Mansard, Michel Taix, Andrea Del Prete
Published in: 2020 IEEE International Conference on Robotics and Automation (ICRA), 2020, Page(s) 6604-6610, ISBN 978-1-7281-7395-5
Publisher: IEEE
DOI: 10.1109/icra40945.2020.9197371

Predicted Composite Signed-Distance Fields for Real-Time Motion Planning in Dynamic Environments
Author(s): Mark Finean, Wolfgang Merkt Oxford Robotics Institute, University of Oxford Ioannis Havoutis
Published in: Proceedings of the International Conference on Automated Planning and Scheduling, Issue 21 1, 2021, Page(s) 616-624
Publisher: Association for the Advancement of Artificial Intelligence
DOI: 10.48550/arxiv.2008.00969

Optimization of Robot Configurations for Motion Planning in Industrial Riveting
Author(s): Girgin, H., Lembono, T.S., Cirligeanu, R. and Calinon, S.
Published in: IEEE Intl Conf. on Advanced Robotics (ICAR), 2021
Publisher: IEEE

Real-Time Motion Planning in Changing Environments Using Topology-Based Encoding of Past Knowledge

Author(s): Richard Fisher, Benjamin Rosman, Vladimir Ivan
Published in: 2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2018, Page(s) 6512-6517, ISBN 978-1-5386-8094-0
Publisher: IEEE
DOI: 10.1109/iros.2018.8593879

Crocoddyl: Fast computation, Efficient solvers, Receding horizon and Learning

Author(s): Nicolas Mansard
Published in: JNRR (French Days for Robotics), 2020
Publisher: --

Variable Autonomy of Whole-body Control for Inspection and Intervention in Industrial Environments using Legged Robots

Author(s): Guiyang Xin, Carlo Tiseo, Wouter Wolfslag, Joshua Smith, Oguzhan Cebe, Zhibin Li, Sethu Vijayakumar, Michael Mistry
Published in: 2020 IEEE 16th International Conference on Automation Science and Engineering (CASE), 2020, Page(s) 1415-1420, ISBN 978-1-7281-6904-0
Publisher: IEEE
DOI: 10.1109/case48305.2020.9216813

Implementation of a Reactive Walking Controller for the New Open-Hardware Quadruped Solo-12

Author(s): Pierre-Alexandre Léziart, Thomas Flayols, Felix Grimminger, Nicolas Mansard, Philippe Souères
Published in: IEEE ICRA, 2021
Publisher: IEEE

Next Steps: Learning a Disentangled Gait Representation for Versatile Quadruped Locomotion

Author(s): Alexander L. Mitchell, Wolfgang Merkt, Mathieu Geisert, Siddhant Gangapurwala, Martin Engelcke, Oiwi Parker Jones, Ioannis Havoutis, Ingmar Posner
Published in: IEEE International Conference on Robotics and Automation (ICRA), 2022
Publisher: IEEE
DOI: 10.48550/arxiv.2112.04809

Robust Humanoid Locomotion Using Trajectory Optimization and Sample-Efficient Learning *

Author(s): Mohammad Hasan Yeganegi, Majid Khadiv, S. Ali A. Moosavian, Jia-Jie Zhu, Andrea Del Prete, Ludovic Righetti
Published in: 2019 IEEE-RAS 19th International Conference on Humanoid Robots (Humanoids), 2019, Page(s) 170-177, ISBN 978-1-5386-7630-1
Publisher: IEEE
DOI: 10.1109/humanoids43949.2019.9035003

Leveraging Contact Forces for Learning to Grasp
Author(s): Hamza Merzic, Miroslav Bogdanovic, Daniel Kappler, Ludovic Righetti, Jeannette Bohg
Published in: 2019 International Conference on Robotics and Automation (ICRA), 2019, Page(s) 3615-3621, ISBN 978-1-5386-6027-0
Publisher: IEEE
DOI: 10.1109/icra.2019.8793733

Learning Task-Specific Dynamics to Improve Whole-Body Control
Author(s): Andrej Gams, Sean A. Mason, Ales Ude, Stefan Schaal, Ludovic Rigbetti
Published in: 2018 IEEE-RAS 18th International Conference on Humanoid Robots (Humanoids), 2018, Page(s) 280-283, ISBN 978-1-5386-7283-9
Publisher: IEEE
DOI: 10.1109/humanoids.2018.8624970

Learning Whole-body Motor Skills for Humanoids
Author(s): Chuanyu Yang, Kai Yuan, Wolfgang Merkt, Taku Komura, Sethu Vijayakumar, Zhibin Li
Published in: 2018 IEEE-RAS 18th International Conference on Humanoid Robots (Humanoids), 2018
Publisher: IEEE

Learning to Explore in Motion and Interaction Tasks
Author(s): Miroslav Bogdanovic, Ludovic Righetti
Published in: 2019 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2019, Page(s) 2686-2692, ISBN 978-1-7281-4004-9
Publisher: IEEE
DOI: 10.1109/iros40897.2019.8968584

Real-Time Trajectory Adaptation for Quadrupedal Locomotion using Deep Reinforcement Learning
Author(s): Siddhant Gangapurwala, Mathieu Geisert, Romeo Orsolino, Maurice Fallon and Ioannis Havoutis
Published in: 2021 IEEE International Conference on Robotics and Automation (ICRA), Issue May 2021, 2021, ISBN 978-1-7281-9077-8
Publisher: IEEE
DOI: 10.1109/icra48506.2021.9561639

Estimating 3D Motion and Forces of Person-Object Interactions From Monocular Video
Author(s): Zongmian Li; Jiri Sedlar; Justin Carpentier; Ivan Laptev; Nicolas Mansard; Josef Sivic
Published in: "IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR 2019), Jun 2019, Long Beach, United States. pp.8632-8641, ⟨10.1109/CVPR.2019.00884⟩", Issue 5, 2019

Publisher: IEEE
DOI: 10.1109/cvpr.2019.00884

Convex strategies for trajectory optimisation: application to the Polytope Traversal Problem
Author(s): Steve Tonneau
Published in: Proceedings of the International Conference on Robotics and Automation (ICRA 2022), 2022
Publisher: IEEE

Inverse Dynamics vs. Forward Dynamics in Direct Transcription Formulations for Trajectory Optimization
Author(s): Henrique Ferrolho; Vladimir Ivan; Wolfgang Merkt; Ioannis Havoutis; Sethu Vijayakumar
Published in: 2021 IEEE International Conference on Robotics and Automation, Issue 3, 2021, Page(s) 12752-12758, ISSN 1050-4729
Publisher: IEEE
DOI: 10.1109/icra48506.2021.9561306

Odometry Based on Auto-Calibrating Inertial Measurement Unit Attached to the Feet
Author(s): Dinesh Atchuthan, Angel Santamaria-Navarro, Nicolas Mansard, Olivier Stasse, Joan Solà
Published in: IEEE Humanoids, 2018, ISBN 978-3-9524-2698-2
Publisher: IEEE
DOI: 10.23919/ecc.2018.8550094

A hybrid collision model for safety collision control
Author(s): Thibault Noël, Thomas Flayols, Joseph Mirabel, Justin Carpentier, Nicolas Mansard
Published in: IEEE ICRA, 2021
Publisher: IEEE

Differential Dynamic Programming for Multi-Phase Rigid Contact Dynamics
Author(s): Rohan Budhiraja, Justin Carpentier, Carlos Mastalli, Nicolas Mansard
Published in: 2018 IEEE-RAS 18th International Conference on Humanoid Robots (Humanoids), 2018, Page(s) 1-9, ISBN 978-1-5386-7283-9
Publisher: IEEE
DOI: 10.1109/humanoids.2018.8624925

Online Optimal Impedance Planning for Legged Robots
Author(s): Franco Angelini, Guiyang Xin, Wouter J. Wolfslag, Carlo Tiseo, Michael Mistry, Manolo Garabini, Antonio Bicchi, Sethu Vijayakumar
Published in: 2019 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2019, Page(s) 6028-6035, ISBN 978-1-7281-4004-9

Publisher: IEEE
DOI: 10.1109/iros40897.2019.8967696

Crocoddyl: An Efficient and Versatile Framework for Multi-Contact Optimal Control
Author(s): Carlos Mastalli, Rohan Budhiraja, Wolfgang Merkt, Guilhem Saurel, Bilal Hammoud, Maximilien Naveau, Justin Carpentier, Ludovic Righetti, Sethu Vijayakumar, Nicolas Mansard
Published in: 2020 IEEE International Conference on Robotics and Automation (ICRA), 2020, Page(s) 2536-2542, ISBN 978-1-7281-7395-5
Publisher: IEEE
DOI: 10.1109/icra40945.2020.9196673

A memory of motion for visual predictive control tasks
Author(s): Antonio Paolillo, Teguh Santoso Lembono, Sylvain Calinon
Published in: 2020 IEEE International Conference on Robotics and Automation (ICRA), 2020, Page(s) 9014-9020
Publisher: IEEE
DOI: 10.1109/icra40945.2020.9197216

Continuous-Time Collision Avoidance for Trajectory Optimization in Dynamic Environments
Author(s): Wolfgang Merkt, Vladimir Ivan, Sethu Vijayakumar
Published in: 2019 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2019, Page(s) 7248-7255, ISBN 978-1-7281-4004-9
Publisher: IEEE
DOI: 10.1109/iros40897.2019.8967641

Reliable Trajectories for Dynamic Quadrupedsusing Analytical Costs and Learned Initializations
Author(s): Oliwier Melon, Mathieu Geisert, David Surovik, Ioannis Havoutis, Maurice Fallon
Published in: 2020 IEEE International Conference on Robotics and Automation (ICRA), 2020, ISBN 978-1-7281-7396-2
Publisher: IEEE
DOI: 10.1109/icra40945.2020.9196562

A unified framework for walking and running of bipedal robots
Author(s): Mahrokh Ghoddousi Boroujeni, Elham Daneshmand, Ludovic Righetti, Majid Khadiv
Published in: 2021 20th International Conference on Advanced Robotics (ICAR), 2021
Publisher: IEEE
DOI: 10.1109/icar53236.2021.9659392

Whole Body Model Predictive Control with a Memory of Motion: Experiments on a Torque-Controlled Talos

Author(s): Ewen Dantec, Rohan Budhiraja, Adria Roig, Teguh Lembono, Guilhem Saurel, Olivier Stasse, Pierre Fernbach, Steve Tonneau, Sethu Vijayakumar, Sylvain Calinon, Michel Taïx, Nicolas Mansard
Published in: IEEE ICRA, 2021
Publisher: IEEE

Receding-Horizon Perceptive Trajectory Optimization for Dynamic Legged Locomotion with Learned Initialization
Author(s): Oliwier Melon, Romeo Orsolino, David Surovik, Mathieu Geisert, Ioannis Havoutis, Maurice Fallon
Published in: 2021 IEEE International Conference on Robotics and Automation (ICRA), 2021, ISBN 978-1-7281-9077-8
Publisher: IEEE
DOI: 10.1109/icra48506.2021.9560794

Contact forces pre-integration for the whole body estimation of legged robots
Author(s): Mederic Fourmy, Thomas Flayols, Nicolas Mansard, Joan Solà
Published in: IEEE ICRA, 2021
Publisher: IEEE

Planning in Time-Configuration Space for Efficient Pick-and-Place in Non-Static Environments with Temporal Constraints
Author(s): Yiming Yang, Wolfgang Merkt, Vladimir Ivan, Sethu Vijayakumar
Published in: 2018 IEEE-RAS 18th International Conference on Humanoid Robots (Humanoids), 2018
Publisher: IEEE
DOI: 10.1109/humanoids.2018.8624989

Using a Memory of Motion to Efficiently Warm-Start a Nonlinear Predictive Controller
Author(s): N. Mansard, A. DelPrete, M. Geisert, S. Tonneau, O. Stasse
Published in: 2018 IEEE International Conference on Robotics and Automation (ICRA), 2018, Page(s) 2986-2993, ISBN 978-1-5386-3081-5
Publisher: IEEE
DOI: 10.1109/ICRA.2018.8463154

Learning Whole-body Motor Skills for Humanoids
Author(s): Chuanyu Yang, Kai Yuan, Wolfgang Merkt, Sethu Vijayakumar, Taku Komura, Zhibin Li
Published in: Proc. IEEE-RAS International Conference on Humanoid Robots (Humanoids 2018), 2018
Publisher: IEEE

Whole-Body End-Pose Planning for Legged Robots on Inclined Support Surfaces in Complex Environments

Author(s): Henrique Ferrolho, Wolfgang Merkt, Yiming Yang, Vladimir Ivan, Sethu Vijayakumar
Published in: Proc. IEEE-RAS International Conference on Humanoid Robots (Humanoids 2018), 2018
Publisher: IEEE

Planning in Time-Configuration Space for Efficient Pick-and-Place in Non-Static Environments with Temporal Constraints
Author(s): Yiming Yang, Wolfgang Merkt, Vladimir Ivan, Sethu Vijayakumar
Published in: Proc. IEEE-RAS International Conference on Humanoid Robots (Humanoids 2018), 2018
Publisher: IEEE

The Pinocchio C++ library – A fast and flexible implementation of rigid body dynamics algorithms and their analytical derivatives
Author(s): Justin Carpentier, Guilhem Saurel, Gabriele Buondonno, Joseph Mirabel, Florent Lamiraux, Olivier Stasse and Nicolas Mansard
Published in: IEEE/SICE International Symposium on System Integrations (SII 2019), 2019
Publisher: IEEE/SICE

An MPC Walking Framework with External Contact Forces
Author(s): Sean Mason, Nicholas Rotella, Stefan Schaal, Ludovic Righetti
Published in: 2018 IEEE International Conference on Robotics and Automation (ICRA), 2018, Page(s) 1785-1790, ISBN 978-1-5386-3081-5
Publisher: IEEE
DOI: 10.1109/ICRA.2018.8461236

On Time Optimization of Centroidal Momentum Dynamics
Author(s): Brahayam Ponton, Alexander Herzog, Andrea Del Prete, Stefan Schaal, Ludovic Righetti
Published in: 2018 IEEE International Conference on Robotics and Automation (ICRA), 2018, Page(s) 1-7, ISBN 978-1-5386-3081-5
Publisher: IEEE
DOI: 10.1109/ICRA.2018.8460537

Odometry Based on Auto-Calibrating Inertial Measurement Unit Attached to the Feet
Author(s): Dinesh Atchuthan, Angel Santamaria-Navarro, Nicolas Mansard, Olivier Stasse, Joan Solà
Published in: European Control Conference (ECC 2018), 2018
Publisher: ECC

Analytical Derivatives of Rigid Body Dynamics Algorithms

Author(s): Justin Carpentier, Nicolas Mansard
Published in: Robotics: Science and Systems (RSS 2018), 2018
Publisher: RSS

Dynamics Consensus between Centroidal and Whole-Body Models for Locomotion of Legged Robots
Author(s): Rohan Budhiraja, Justin Carpentier, Nicolas Mansard
Published in: IEEE International Conference on Robotics and Automation 2019, 2019
Publisher: IEEE

Contact Planning for the ANYmal Quadruped Robot using an Acyclic Reachability-Based Planner
Author(s): Geisert, Mathieu; Yates, Thomas; Orgen, Asil; Fernbach, Pierre; Havoutis, Ioannis
Published in: Towards Autonomous Robotic Systems Conference (TAROS) 2019, Jul 2019, London, United Kingdom, Issue 20, 2019
Publisher: TAROS

Meta-learning via learned loss
Author(s): Sarah Bechtle, Artem Molchanov, Yevgen Chebotar, Edward Grefenstette, Ludovic Righetti, Gaurav Sukhatme, Franziska Meier
Published in: 25th International Conference on Pattern Recognition, 2021
Publisher: IEEE
DOI: 10.1109/icpr48806.2021.9412010

Equivalence of the Projected Forward Dynamics and the Dynamically Consistent Inverse Solution
Author(s): João Moura, Vladimir Ivan, Mustapha Suphi Erden, Sethu Vijayakumar
Published in: Robotics: Science and Systems Proceedings, Issue XV, 2019, Page(s) 1-10, ISSN 2330-765X
Publisher: 1-10
DOI: 10.15607/rss.2019.xv.036

Comparing Alternate Modes of Teleoperation for Constrained Tasks
Author(s): Christopher E. Mower, Wolfgang Merkt, Aled Davies, Sethu Vijayakumar
Published in: 2019 IEEE 15th International Conference on Automation Science and Engineering (CASE), 2019, Page(s) 1497-1504, ISBN 978-1-7281-0356-3
Publisher: IEEE
DOI: 10.1109/coase.2019.8843265

Efficient Humanoid Contact Planning using Learned Centroidal Dynamics Prediction
Author(s): Yu-Chi Lin, Brahayam Ponton, Ludovic Righetti, Dmitry Berenson
Published in: 2019 International Conference on Robotics and Automation (ICRA), 2019, Page(s) 5280-5286, ISBN 978-1-5386-6027-0

Publisher: IEEE
DOI: 10.1109/icra.2019.8794032

Leveraging Precomputation with Problem Encoding for Warm-Starting Trajectory Optimization in Complex Environments
Author(s): Wolfgang Merkt, Vladimir Ivan, Sethu Vijayakumar
Published in: 2018 IEEE/RSJ International Conference on Intelligent Robots and Systems, 2018
Publisher: Institute of Electrical and Electronics Engineers (IEEE)
DOI: 10.1109/iros.2018.8593977

Automatic Gait Pattern Selection for Legged Robots
Author(s): Jiayi Wang, Iordanis Chatzinikolaidis, Carlos Mastalli, Wouter Wolfslag, Guiyang Xin, Steve Tonneau, Sethu Vijayakumar
Published in: 2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2020, ISBN 978-1-7281-6212-6
Publisher: IEEE
DOI: 10.1109/iros45743.2020.9340789

Leveraging Forward Model Prediction Error for Learning Control
Author(s): Sarah Bechtle, Bilal Hammoud, Akshara Rai, Franziska Meier, Ludovic Righetti
Published in: 2021 IEEE-RAS International Conference on Robotics and Automation (ICRA), 2021
Publisher: IEEE
DOI: 10.1109/icra48506.2021.9561396

Learning How to Walk: Warm-starting Optimal Control Solver with Memory of Motion
Author(s): Teguh Santoso Lembono, Carlos Mastalli, Pierre Fernbach, Nicolas Mansard, Sylvain Calinon
Published in: 2020 IEEE International Conference on Robotics and Automation (ICRA), 2020, Page(s) 1357-1363, ISSN 978-1-7281-7395-
Publisher: IEEE
DOI: 10.1109/icra40945.2020.9196727

Squash-Box Feasibility Driven Differential Dynamic Programming
Author(s): Josep Marti-Saumell, Joan Solà, Carlos Mastalli, Angel Santamaria-Navarro
Published in: IEEE International Conference on Intelligent Robots and Systems 2020, 2020
Publisher: Institute of Electrical and Electronics Engineers (IEEE)

High-Frequency Nonlinear Model Predictive Control of a Manipulator

Author(s): Sébastien Kleff, Avadesh Meduri, Rohan Budhiraja, Nicolas Mansard, Ludovic Righetti
Published in: IEEE ICRA, 2021
Publisher: IEEE

Preintegrated Velocity Bias Estimation to OvercomeContact Nonlinearities in Legged Robot Odometry
Author(s): David Wisth, Marco Camurri, Maurice Fallon
Published in: 2020 IEEE International Conference on Robotics and Automation (ICRA), 2021, ISBN 978-1-7281-7396-2
Publisher: IEEE
DOI: 10.1109/icra40945.2020.9197214

Rapid Convex Optimization of Centroidal Dynamics using Block Coordinate Descent
Author(s): Paarth Shah, Avadesh Meduri, Wolfgang Merkt, Majid Khadiv, Ioannis Havoutis, Ludovic Righetti
Published in: 2021 IEEE/RSJ International Conference on Intelligent Robots and Systems, 2021
Publisher: IEEE
DOI: 10.1109/iros51168.2021.9635856

Generative Adversarial Training of Product of Policies for Robust and Adaptive Movement Primitives
Author(s): Emmanuel Pignat, Hakan Girgin, Sylvain Calinon
Published in: Proc. Conference on Robot Learning (CoRL), 2020
Publisher: PMLR

Curious iLQR: Resolving Uncertainty in Model-based RL
Author(s): Sarah Bechtle, Yixin Lin, Akshara Rai, Ludovic Righetti, Franziska Meier
Published in: Proceedings of the Conference on Robot Learning, Issue 100, 2020, Page(s) 162-171
Publisher: Proceedings of Machine Learning Research

Learning to steer a locomotion contact planner
Author(s): Jason Chemin, Pierre Fernbach, Daeun Song, Nicolas Mansard, Steve Tonneau
Published in: IEEE ICRA, 2021
Publisher: IEEE

Online LiDAR-SLAM for Legged Robots with Robust Registration and Deep-Learned Loop Closure
Author(s): Milad Ramezani, Georgi Tinchev, Egor Iuganov and Maurice Fallon
Published in: IEEE International Conference on Robotics and Automation (ICRA), 2022, ISBN 978-1-7281-7395-5

Publisher: IEEE
DOI: 10.1109/icra40945.2020.9196769

Variational Inference with Mixture Model Approximation for Applications in Robotics
Author(s): Emmanuel Pignat, Teguh Lembono, Sylvain Calinon
Published in: 2020 IEEE International Conference on Robotics and Automation (ICRA), 2020, Page(s) 3395-3401, ISBN 978-1-7281-7395-5
Publisher: IEEE
DOI: 10.1109/icra40945.2020.9197166

Computational design of energy-efficient legged robots: Optimizing for size and actuators
Author(s): Gabriele Fadini, Thomas Flayols, Andrea del Prete, Nicolas Mansard, Philippe Souères
Published in: IEEE ICRA, 2021
Publisher: IEEE

Peer reviewed articles (39)

Residual force polytope: Admissible task-space forces of dynamic trajectories
Author(s): Henrique Ferrolho, Wolfgang Merkt, Carlo Tiseo, Sethu Vijayakumar
Published in: Robotics and Autonomous Systems, Issue 103814, 2021, ISSN 0921-8890
Publisher: Elsevier BV
DOI: 10.1016/j.robot.2021.103814

Efficient Multi-Contact Pattern Generation with Sequential Convex Approximations of the Centroidal Dynamics
Author(s): Brahayam Ponton, Majid Khadiv, Avadesh Meduri, Ludovic Righetti
Published in: IEEE Transactions on Robotics, Issue 37 (5), 2021, ISSN 1941-0468
Publisher: IEEE
DOI: 10.1109/tro.2020.3048125

Learning Constrained Distributions of Robot Configurations with Generative Adversarial Network
Author(s): Teguh S. Lembono, Emmanuel Pignat, Julius Jankowski, Sylvain Calinon
Published in: IEEE Robotics and Automation Letters (RA-L), Issue 23773766, 2021, ISSN 2377-3766
Publisher: IEEE
DOI: 10.1109/lra.2021.3068671

Reactive Balance Control for Legged Robots under Visco-Elastic Contacts

Author(s): Thomas Flayols, Andrea Del Prete, Majid Khadiv, Nicolas Mansard, Ludovic Righetti
Published in: Applied Sciences, Issue 11/1, 2021, Page(s) 353, ISSN 2076-3417
Publisher: MDPI
DOI: 10.3390/app11010353

C-CROC: Continuous and Convex Resolution of Centroidal Dynamic Trajectories for Legged Robots in Multicontact Scenarios
Author(s): Pierre Fernbach, Steve Tonneau, Olivier Stasse, Justin Carpentier, Michel Taix
Published in: IEEE Transactions on Robotics, Issue 36/3, 2020, Page(s) 676-691, ISSN 1552-3098
Publisher: Institute of Electrical and Electronics Engineers
DOI: 10.1109/tro.2020.2964787

SCALAR: Simultaneous Calibration of 2-D Laser and Robot Kinematic Parameters Using Planarity and Distance Constraints
Author(s): Teguh Santoso Lembono, Francisco Suarez-Ruiz, Quang-Cuong Pham
Published in: IEEE Transactions on Automation Science and Engineering, Issue 16/4, 2019, Page(s) 1971-1979, ISSN 1545-5955
Publisher: Institute of Electrical and Electronics Engineers
DOI: 10.1109/tase.2019.2918141

An Open Torque-Controlled Modular Robot Architecture for Legged Locomotion Research
Author(s): Felix Grimminger, Avadesh Meduri, Majid Khadiv, Julian Viereck, Manuel Wuthrich, Maximilien Naveau, Vincent Berenz, Steve Heim, Felix Widmaier, Thomas Flayols, Jonathan Fiene, Alexander Badri-Sprowitz, Ludovic Righetti
Published in: IEEE Robotics and Automation Letters, Issue 5/2, 2020, Page(s) 3650-3657, ISSN 2377-3766
Publisher: IEEE
DOI: 10.1109/lra.2020.2976639

RLOC: Terrain-Aware Legged Locomotion using Reinforcement Learning and Optimal Control
Author(s): Siddhant Gangapurwala, Mathieu Geisert, Romeo Orsolino, Maurice Fallon and Ioannis Havoutis
Published in: IEEE Transactions on Robotics, 2022, ISSN 1552-3098
Publisher: Institute of Electrical and Electronics Engineers
DOI: 10.1109/tro.2022.3172469

Memory of Motion for Warm-Starting Trajectory Optimization

Author(s): Teguh Santoso Lembono, Antonio Paolillo, Emmanuel Pignat, Sylvain Calinon
Published in: IEEE Robotics and Automation Letters, Issue 5/2, 2020, Page(s) 2594-2601, ISSN 2377-3766
Publisher: IEEE
DOI: 10.1109/lra.2020.2972893

A Survey on Policy Search Algorithms for Learning Robot Controllers in a Handful of Trials
Author(s): Konstantinos Chatzilygeroudis, Vassilis Vassiliades, Freek Stulp, Sylvain Calinon, Jean-Baptiste Mouret
Published in: IEEE Transactions on Robotics, Issue 36/2, 2020, Page(s) 328-347, ISSN 1552-3098
Publisher: Institute of Electrical and Electronics Engineers
DOI: 10.1109/tro.2019.2958211

Impedance Optimization for Uncertain Contact Interactions Through Risk Sensitive Optimal Control
Author(s): Bilal Hammoud, Majid Khadiv, Ludovic Righetti
Published in: IEEE Robotics and Automation Letters, Issue 6 (3), 2021, Page(s) 4766-4773, ISSN 2377-3766
Publisher: IEEE
DOI: 10.1109/lra.2021.3068951

Robust walking based on MPC with viability-based feasibility guarantees
Author(s): Mohammad Hasan Yeganegi, Majid Khadiv, Andrea Del Prete, S. Ali A. Moosavian, Ludovic Righetti
Published in: IEEE Transactions on Robotics, 2021, ISSN 1941-0468
Publisher: IEEE
DOI: 10.1109/tro.2021.3127388

SKD: Keypoint Detection for Point Clouds using Saliency Estimation
Author(s): Georgi Tinchev; Adrian Penate-Sanchez; Maurice Fallon
Published in: IEEE Robotics and Automation Letters, 2021, ISSN 2377-3766
Publisher: IEEE
DOI: 10.1109/lra.2021.3065224

Variable Horizon MPC with Swing Foot Dynamics for Bipedal Walking Control
Author(s): Elham Daneshmand, Majid Khadiv, Felix Grimminger, Ludovic Righetti
Published in: IEEE Robotics and Automation Letters, Issue 6(2), 2021, Page(s) 2349-2356, ISSN 2377-3766
Publisher: IEEE
DOI: 10.1109/lra.2021.3061381

Bayesian Gaussian Mixture Model for Robotic Policy Imitation

Author(s): Emmanuel Pignat, Sylvain Calinon
Published in: IEEE Robotics and Automation Letters, Issue 4/4, 2019, Page(s) 4452-4458, ISSN 2377-3766
Publisher: IEEE
DOI: 10.1109/lra.2019.2932610

Learning from demonstration using products of experts: Applications to manipulation and task prioritization
Author(s): Pignat, Emmanuel; Silvério, João; Calinon, Sylvain
Published in: International Journal of Robotics Research (IJRR), Issue 3, 2022, ISSN 0278-3649
Publisher: SAGE Publications
DOI: 10.1177/02783649211040561

Exponential Integration for Efficient and Accurate Multi-Body Simulation with Stiff Viscoelastic Contacts
Author(s): Bilal Hammoud, Luca Olivieri, Ludovic Righetti, Justin Carpentier, Andrea Del Prete
Published in: Multibody System Dynamics, Issue 54, 2022, Page(s) 443–460, ISSN 1573-272X
Publisher: Springer
DOI: 10.1007/s11044-022-09818-z

Gaussians on Riemannian Manifolds: Applications for Robot Learning and Adaptive Control
Author(s): Sylvain Calinon
Published in: IEEE Robotics & Automation Magazine, Issue 27/2, 2020, Page(s) 33-45, ISSN 1070-9932
Publisher: Institute of Electrical and Electronics Engineers
DOI: 10.1109/mra.2020.2980548

Memory Clustering Using Persistent Homology for Multimodality- and Discontinuity-Sensitive Learning of Optimal Control Warm-Starts
Author(s): Wolfgang Merkt; Vladimir Ivan; Traiko Dinev; Ioannis Havoutis; Sethu Vijayakumar
Published in: Merkt , W X , Ivan , V , Dinev , T , Havoutis , I & Vijayakumar , S 2021 , ' Memory Clustering Using Persistent Homology for Multimodality- and Discontinuity-Sensitive Learning of Optimal Control Warm-Starts ' , IEEE Transactions on Robotics , vol. 37 , no. 5 , pp. 1649 - 1660 . https://doi.org/10.1109/TRO.2021.3069132, Issue 7, 2021, ISSN 1552-3098
Publisher: Institute of Electrical and Electronics Engineers
DOI: 10.1109/tro.2021.3069132

Unified Multi-Modal Landmark Tracking for Tightly Coupled Lidar-Visual-Inertial Odometry

Author(s): David Wisth, Marco Camurri, Sandipan Das, Maurice Fallon
Published in: IEEE Robotics and Automation Letters, Issue 2, 2021, Page(s) 1004-1011, ISSN 2377-3766
Publisher: IEEE
DOI: 10.1109/lra.2021.3056380

Human-in-the-Loop Optimization of Exoskeleton Assistance Via Online Simulation of Metabolic Cost

Author(s): Daniel F. N. Gordon, Christopher McGreavy, Andreas Christou, Sethu Vijayakumar
Published in: IEEE Transactions on Robotics, Issue 3, 2022, Page(s) 1410-1429, ISSN 1552-3098
Publisher: Institute of Electrical and Electronics Engineers
DOI: 10.1109/tro.2021.3133137

Robust Humanoid Contact Planning with Learned Zero- and One-Step Capturability Prediction

Author(s): Y.C. Lin,L. Righetti and D. Bereson
Published in: IEEE Robotics and Automation Letters, Issue 5(2), 2020, Page(s) 2451-2458, ISSN 2377-3766
Publisher: IEEE
DOI: 10.1109/lra.2020.2972825

Effectively Quantifying the Performance of Lower-Limb Exoskeletons Over a Range of Walking Conditions

Author(s): Daniel F. N. Gordon, Graham Henderson, Sethu Vijayakumar
Published in: Frontiers in Robotics and AI, Issue 5, 2018, ISSN 2296-9144
Publisher: Frontiers in Robotics & AI: Biomedical Robotics
DOI: 10.3389/frobt.2018.00061

Constraint-aware learning of policies by demonstration

Author(s): Leopoldo Armesto, João Moura, Vladimir Ivan, Mustafa Suphi Erden, Antonio Sala, Sethu Vijayakumar
Published in: The International Journal of Robotics Research, 2018, Page(s) 027836491878435, ISSN 0278-3649
Publisher: SAGE Publications
DOI: 10.1177/0278364918784354

Learning Task Priorities From Demonstrations

Author(s): Joao Silverio, Sylvain Calinon, Leonel Rozo, Darwin G. Caldwell
Published in: IEEE Transactions on Robotics, 2018, Page(s) 1-17, ISSN 1552-3098
Publisher: Institute of Electrical and Electronics Engineers
DOI: 10.1109/TRO.2018.2878355

A Brief Survey on the Role of Dimensionality Reduction in Manipulation Learning and Control
Author(s): Fanny Ficuciello, Pietro Falco, Sylvain Calinon
Published in: IEEE Robotics and Automation Letters, Issue 3/3, 2018, Page(s) 2608-2615, ISSN 2377-3766
Publisher: IEEE
DOI: 10.1109/LRA.2018.2818933

Learning a Structured Neural Network Policy for a Hopping Task
Author(s): Julian Viereck, Jules Kozolinsky, Alexander Herzog, Ludovic Righetti
Published in: IEEE Robotics and Automation Letters, Issue 3/4, 2018, Page(s) 4092-4099, ISSN 2377-3766
Publisher: IEEE
DOI: 10.1109/LRA.2018.2861466

2PAC
Author(s): Steve Tonneau, Pierre Fernbach, Andrea Del Prete, Julien Pettré, Nicolas Mansard
Published in: ACM Transactions on Graphics, Issue 37/5, 2018, Page(s) 1-14, ISSN 0730-0301
Publisher: Association for Computing Machinary, Inc.
DOI: 10.1145/3213773

Multicontact Locomotion of Legged Robots
Author(s): Justin Carpentier, Nicolas Mansard
Published in: IEEE Transactions on Robotics, Issue 34/6, 2018, Page(s) 1441-1460, ISSN 1552-3098
Publisher: Institute of Electrical and Electronics Engineers
DOI: 10.1109/TRO.2018.2862902

Passive Whole-body Control for Quadruped Robots: Experimental Validation over Challenging Terrain
Author(s): Shamel Fahmi, Carlos Mastalli, Michele Focchi, Claudio Semini
Published in: IEEE Robotics and Automation Letters, 2019, Page(s) 1-1, ISSN 2377-3766
Publisher: IEEE Robotics
DOI: 10.1109/lra.2019.2908502

Application of Wrench-Based Feasibility Analysis to the Online Trajectory Optimization of Legged Robots
Author(s): Romeo Orsolino, Michele Focchi, Carlos Mastalli, Hongkai Dai, Darwin G. Caldwell, Claudio Semini
Published in: IEEE Robotics and Automation Letters, Issue 3/4, 2018, Page(s) 3363-3370, ISSN 2377-3766

Publisher: IEEE Robotics
DOI: 10.1109/lra.2018.2836441

Motion Planning for Quadrupedal Locomotion: Coupled Planning, Terrain Mapping, and Whole-Body Control
Author(s): Carlos Mastalli, Ioannis Havoutis, Michele Focchi, Darwin G. Caldwell, Claudio Semini
Published in: IEEE Transactions on Robotics, Issue 36/6, 2020, Page(s) 1635-1648, ISSN 1552-3098
Publisher: Institute of Electrical and Electronics Engineers
DOI: 10.1109/tro.2020.3003464

Walking Control Based on Step Timing Adaptation
Author(s): Majid Khadiv, Alexander Herzog, S. Ali. A. Moosavian, Ludovic Righetti
Published in: IEEE Transactions on Robotics, Issue 36/3, 2020, Page(s) 629-643, ISSN 1552-3098
Publisher: Institute of Electrical and Electronics Engineers
DOI: 10.1109/tro.2020.2982584

A Robustness Analysis of Inverse Optimal Control of Bipedal Walking
Author(s): John R. Rebula, Stefan Schaal, James Finley, Ludovic Righetti
Published in: IEEE Robotics and Automation Letters, Issue 4/4, 2019, Page(s) 4531-4538, ISSN 2377-3766
Publisher: IEEE
DOI: 10.1109/lra.2019.2933766

Learning Variable Impedance Control for Contact Sensitive Tasks
Author(s): Miroslav Bogdanovic, Majid Khadiv, Ludovic Righetti
Published in: IEEE Robotics and Automation Letters, Issue 5/4, 2020, Page(s) 6129-6136, ISSN 2377-3766
Publisher: IEEE
DOI: 10.1109/lra.2020.3011379

Solving Footstep Planning as a Feasibility Problem Using L1-Norm Minimization
Author(s): Daeun Song; Pierre Fernbach; Thomas Flayols; Andrea Del Prete; Nicolas Mansard; Steve Tonneau; Young J. Kim
Published in: https://hal.laas.fr/hal-03435135, 2021, ISSN 2377-3766
Publisher: IEEE
DOI: 10.1109/lra.2021.3088797

Learning an Expert Skill-Space for Replanning Dynamic Quadruped Locomotion over Obstacles
Author(s): David Surovik, Oliwier Melon, Mathieu Geisert, Maurice Fallon, Ioannis Havoutis

Published in: Proceedings of Machine Learning Research, Issue 155, 2021, Page(s) 1509-1518, ISSN 2640-3498
Publisher: Journal of Machine Learning Research

First Order Approximation of Model Predictive Control Solutions for High Frequency Feedback
Author(s): Ewen Dantec, Michel Taïx, Nicolas Mansard
Published in: IEEE RAL, 2022, ISSN 2377-3766
Publisher: IEEE
DOI: 10.1109/lra.2022.3149573

Pronto: A Multi-Sensor State Estimator for Legged Robots in Real-World Scenarios
Author(s): Marco Camurri, Milad Ramezani, Simona Nobili, and Maurice Fallon
Published in: Frontiers in Robotics and AI, Issue 7, 2020, ISSN 2296-9144
Publisher: Frontiers
DOI: 10.3389/frobt.2020.00068

Other (10)

Agile Maneuvers in Legged Robots: a Predictive Control Approach
Author(s): Carlos Mastalli, Wolfgang Merkt, Guiyang Xin, Jaehyun Shim, Michael Mistry, Ioannis Havoutis, Sethu Vijayakumar
Published in: 2022
Publisher: arxiv

BiConMP: A Nonlinear Model Predictive Control Framework for Whole Body Motion Planning
Author(s): Avadesh Meduri, Paarth Shah, Julian Viereck, Majid Khadiv, Ioannis Havoutis, Ludovic Righetti
Published in: IEEE Transactions on Robotics (Submitted), 2022
Publisher: IEEE
DOI: 10.48550/arxiv.2201.07601

Value learning from trajectory optimization and Sobolev descent: A step toward reinforcement learning with superlinear convergence properties
Author(s): Amit Parag, Sébastien Kleff, Léo Saci, Nicolas Mansard, Olivier Stasse
Published in: IEEE ICRA (accepted), 2022
Publisher: IEEE

A Direct-Indirect Hybridization Approach to Control-Limited DDP
Author(s): Carlos Mastalli, Wolfgang Merkt, Josep Marti-Saumell, Henrique Ferrolho, Joan Sola, Nicolas Mansard, Sethu Vijayakumar

Published in: 2021
Publisher: Arxiv

Model-free Reinforcement Learning for Robust Locomotion using Demonstrations from Trajectory Optimization
Author(s): Bogdanovic, Miroslav; Khadiv, Majid; Righetti, Ludovic
Published in: Frontiers in Robotics and AI (submitted), 2022
Publisher: Frontiers

Constrained Differential Dynamic Programming: A primal-dual augmented Lagrangian approach
Author(s): Jallet, Wilson; Bambade, Antoine; Mansard, Nicolas; Carpentier, Justin
Published in: IEEE IROS (submitted), 2022
Publisher: IEEE

Improved Control Scheme for the Solo Quadruped and Experimental Comparison of Model Predictive Controllers
Author(s): Léziart, Pierre-Alexandre; Corbères, Thomas; Flayols, Thomas; Tonneau, Steve; Mansard, Nicolas; Souères, Philippe
Published in: IEEE RAL (submitted), 2022
Publisher: IEEE

Implicit Differential Dynamic Programming
Author(s): Wilson Jallet; Nicolas Mansard; Justin Carpentier
Published in: IEEE ICRA (accepted), 2022
Publisher: IEEE

Introducing Force Feedback in Model Predictive Control
Author(s): Sébastien Kleff, Ewen Dantec, Guilhem Saurel, Nicolas Mansard, Ludovic Righetti
Published in: IEEE IROS (subm), 2022
Publisher: IEEE

Stagewise Newton Method for Dynamic Game Control with Imperfect State Observation
Author(s): Armand Jordana, Bilal Hammoud, Ludovic Righetti
Published in: IEEE Control Systems Letters (accepted), 2022
Publisher: IEEE

Book chapters (3)

Mixture Models for the Analysis, Edition, and Synthesis of Continuous Time Series

Author(s): Sylvain Calinon
Published in: Mixture Models and Applications, 2020, Page(s) 39-57, ISBN 978-3-030-23875-9
Publisher: Springer International Publishing
DOI: 10.1007/978-3-030-23876-6_3

Heuristic Planning for Rough Terrain Locomotion in Presence of External Disturbances and Variable Perception Quality
Author(s): Focchi, Michele and Orsolino, Romeo G and Camurri, Marco and Barasuol, Victor and Mastalli, Carlos and Caldwell, Darwin and Semini, Claudio
Published in: Springer Track in Advanced Robotics series, 2018, 2018
Publisher: Springer

EXOTica: An Extensible Optimization Toolset for Prototyping and Benchmarking Motion Planning and Control
Author(s): Vladimir Ivan, Yiming Yang, Wolfgang Merkt, Michael P. Camilleri, Sethu Vijayakumar
Published in: Robot Operating System (ROS), 2019, Page(s) 211-240, ISBN 978-3-319-91590-6
Publisher: Springer International Publishing
DOI: 10.1007/978-3-319-91590-6_7

Other Research Products

Other Research Products via OpenAire (2)

BiConMP: A Nonlinear Model Predictive Control Framework for Whole Body Motion Planning
Author(s): Meduri, Avadesh; Shah, Paarth; Viereck, Julian; Khadiv, Majid; Havoutis, Ioannis; Righetti, Ludovic
Published in: arXiv

Next Steps: Learning a Disentangled Gait Representation for Versatile Quadruped Locomotion
Author(s): Mitchell, Alexander L.; Merkt, Wolfgang; Geisert, Mathieu; Gangapurwala, Siddhant; Engelcke, Martin; Jones, Oiwi Parker; Havoutis, Ioannis; Posner, Ingmar
Published in: arXiv

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