Guillermo A. Castillo

Columbus, OH
 (614)680-4474
✉ castillomartinez.2@osu.edu
🌐 www.guillermo-castillo.com

Ph.D. candidate in Electrical and Computer Engineering. Experienced Robotics Engineer with six years of specialization in robust locomotion controllers for bipedal robots. Proven track record in applying complex reinforcement learning strategies and model-based controller design in simulation and hardware. Seeking a challenging industry role leveraging analytical skills, hardware testing experience, and proficiency in various programming languages to drive innovative solutions in robotics.

Selected Projects

- **Effective state representation for learning hierarchical robust perceptive locomotion.** Designed a hierarchical framework for bipedal locomotion that merges a data-driven state representation of the system's dynamics and local terrain information with a Reinforcement Learning (RL)-based high-level (HL) policy for real-time generation of task space commands and a model-based low-level (LL) task space controller for trajectory tracking.
- **Learning-based cascade controllers for robust bipedal locomotion.** Worked on the hierarchical combination of model-free and model-based techniques to design controllers that realize light-weighted and sample-efficient policies (95% reduction compared with comparable SOTA methods) for robust dynamic locomotion on bipedal robots. Successful hardware implementation on the robot Digit. More details: https://sites.google.com/view/rl-cmpd.
- **Linear policies for robust bipedal walking and hopping on challenging terrains.** Development of a control pipeline to learn simple and interpretable linear policies for bipedal walking and hopping with no loss of performance on challenging terrains like slopes and stairs. Learned policies are successfully transferred to hardware without the need for additional tuning.
- **Off-policy learning for bipedal locomotion.** Design of an RL framework to gradually learn complex locomotion tasks by i) exploiting offline data collected from previously learned experiences, and ii) using a generalized hybrid zero dynamics framework to formulate a lightweight locomotion control policy. Simulation results with the planar bipedal robot Rabbit.

Skills

- **Software**: Matlab, ROS, Gazebo, MuJoCo, Isaac Gym.
- **Programming languages**: Matlab, Python, C++.
- **Technical writing**: Published articles in top-tier robotics conferences and journals.
- Strong collaboration skills for successful team project completion.
- Experienced in mentoring, strong leadership, and communication skills.

Experience

Aug. 2017 - Dec. 2023	**Graduate Research Associate**, *The Ohio State University*, Columbus, Ohio, USA. Worked in system identification, model-based controller design, reinforcement learning, data-driven control, and hardware implementation of controllers for bipedal locomotion (sim-to-real transfer). Assisted in tasks for lab management, successfully procuring new resources, creating and maintaining code repositories, designing hardware experiments, and coordinating team meetings and demos for lab visitors. Mentored undergraduate and graduate students at the lab with research projects and honors theses.
Sep. 2015 - Jul. 2017	**Full-time lecturer and lab instructor**, *National Polytechnic School*, Quito, Ecuador. Instructed undergraduate courses to groups of up to 50 students. Classes taught: Geometry Fundamentals, Chemistry Fundamentals, Electricity Fundamentals, Electrical Technology lab, Electrical Circuits lab.
Sep. 2014 - Aug. 2015	**Laboratory Assistant**, *National Polytechnic School*, Quito, Ecuador. Prepared laboratory equipment for practices. Planned regular maintenance of computers and laboratory equipment. Supported students to use lab equipment for projects and theses.

Honors & Awards

May 2023	**Best Paper Award**, *International Conference on Robotics and Automation 2023*, London, UK Workshop on Effective Representations, Abstractions, and Priors for Robot Learning.
Jan. 2023	**Presidential Fellowship**, *The Ohio State University*, Ohio, USA. Fellowship to support graduate students to continue their research and complete their dissertations.
Aug. 2017	**Fulbright Faculty Development Scholarship**, *Fulbright Commission*, Quito, Ecuador. Scholarship provided to pursue graduate education in the USA.
May. 2014	**Travel Award**, *TU Delft*, Delft, Holland. Scholarship to attend coursework in Photovoltaic Solar Energy at TU Delft.

Education

2019-2023	**Ph.D. in Electrical and Computer Engineering**, *The Ohio State University*, Columbus, Ohio, USA.
2017-2019	**M.Sc. in Electrical and Computer Engineering**, *The Ohio State University*, Columbus, Ohio, USA.
2009–2015	**Engineer in Electronics and Control**, *National Polytechnic School*, Quito, Ecuador.