Cristiana M de Farias

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Education

University of Brasilia *2017–April 2019(expected)*
M.S., Control and Automation
Advisor: Dr. Joao Yoshiyuki Ishihara

University of Brighton *2013–2014*
Exchange B.S. Electrical and Electronic Engineering

University of Brasilia *2010–2016*
B.S., Control and Automation Engineering
Dissertation: Métodos de Comunicação Visual e Controle Cooperativo entre robôs Humanóides (Methods for visual communication and cooperative control between humanoid robots)
Advisor: Dr. Mariana Costa Bernardes

Grants and Awards

NCCR Masters Internship for Woman Grant Winner
Swiss National Centre of Competence in Research
BioRob Laboratory - EPFL: 2018

Master Research Scholarship
CAPES: Coordination for the Improvement of Higher Education Personnel
University of Brasilia - Unb: 2017-2018

Science Without Borders Scholarship for an exchange year at University of Brighton (UK)
CNPQ: National Council for Scientific and Technological Development
University of Brasilia - Unb: 2013-2014

- Science Without Borders Scholarship for an exchange year at University of Brighton (UK) awarded by the National Council for Scientific and Technological Development. 2013-2014

Honourable Mention for best STEM work *Oct., 2016*
The Joint 13th Scientific Initiation and 22nd Univ. of Brasilia Congress for undergraduate fellows
Title: Controle de robô humanóide para interação colaborativa com seres humanos (Control of humanoid robot for interaction with human beings)
Author: Cristiana Miranda de Farias

First Place – Standard Platform League Drop-in
Unbeatables Team
Latin American Robotics Competition (LARC), Recife, PE, Brazil: Oct. 2016
Latin American Robotics Competition (LARC), Uberlândia, MG, Brazil: Oct. 2015
Latin American Robotics Competition (LARC), São Carlos, SP, Brazil: Oct. 2014

Most Valuable Player – Standard Platform League Drop-In Only
Unbeatables Team
Robocup 2016, Leipzig, Germany: Jun. 2016
Robocup 2015, Hefei, China: Jul. 2015

Research Experience

Master's Student *2017-Ongoing*

Department of Electrical Engineering, University of Brasilia

- Developed an algorithm for the Recursive Newton-Euler Inverse Dynamics using the algebra of dual quaternions guaranteeing lower computational costs than a similar algorithm on other algebras.
- Is working on the force control for rigid and complacent robots within the algebra of dual quaternions.

Masters Internship *2018*

BioRob Laboratory, École Polytechnique Fédérale de Lausanne

- Worked with the COMAN Robot and members of the COGIMON project to develop an application which the robot sees a labelled object, walks towards it and grabs the object.
- Implementation of C++/OpenCv/OpenNi code to detect lables with RGBD image and estimate their position with respect to the camera.
- Learned about the walking controller the COGIMON group had implemented on the COMAN robot and added a turning function to it. Also integrated proportional outer control loop with the vision information providing feedback.
- UUsed robot's kinematic information to enhance robotâĂŹs position estimation on the world frame.
- Worked on integrating RTAB-Map SLAM software to C++ vision code. Also used C++11 threads to integrate vision code to the rest of the project.

Undergrad Fellowship for Scientific Initiation and Undergrad Student Researcher *2014–2016*

Laboratory of Robotics and Automation, University of Brasilia

- Mathematical definition for bi-manual manipulation by using the dual quaternion algebra on the NAO robot, mainly using the dual cooperative task-space;
- Implementation of control strategies on NAO platform and on Simulated environment V-Rep. In this context, we also studied strategies for singularity avoidance and joint limit avoidance. The project was done using the ROS framework.
- Development of algorithms for robot vision implemented on NAO with OpenCV.
- Implementation of voice recognition interfaces for the robot NAO in the context of the experiment of a treasure hunt game.

Summer Research Project on CAN networks *2014*

University of Brighton

- Studied the CAN protocol and implemented a small network in the Arduino board;

Research Project on ECG signal processing *2012*

University of Brasilia

- Development of a graphical user interface for dealing with ECG signals in Matlab;
- Processing of ECG data and statistical analysis.

Professional Experience

Teaching Internship: Intern *2018*

Teaching Internship with professor João Ishihara at UnB. Mostly helped in the undergraduate course "Dynamical Control", mainly lecturing classes on State Space Control and applying the final test on the subject.

LABCERT – Lab. of Testing and Certification of Electro-medical equipments: Intern *2016-2017*

Studied the ABNT NBR IEC 60601-1 standard, and performed related tests in regards to Quality, Electrical Security and Electromagnetic compatibility tests on Electro-Medical equipments.

UnBeatables – Humanoid Robot Soccer: Team Leader *2015-2016*

Participated in the Robocup and Latin American Robotics competition in the context of the Standard Platform League - DropIn. Also worked as student coordinator for the team: where main tasks were overseing code development, performing administrative tasks such as the production of team description papers for participating in competitions and talking to sponsors to guarantee funding for participating in the competitions. Mainly worked on code development in C++ and Python for the development of a state machine for the robotâĂŹs behaviour during the game and the code architecture with different threads running in parallel.

UnBeatables – Humanoid Robot Soccer: Team Member *2014*

Evaluated different ball detection algorithms to enhance results. Also helped program a video-capture interface (Qt Gui) for simulation purposes. Helped in teaching an extracurricular short course on how to use ROS to program a NAO robot titled "Robotic tools and Humanoid Robots" that was promoted by a local IEEE chapter.

Mecajun - Mecatrônica Júnior de Brasília: R&D Consultant *2012-2013*

Execution of projects related to automaticaly counting newspapers, trained new members and developed study material for Arduino. Also was involved in the marketing group.

Tutoring of disciplines: *2011, 2015*

Tutor on the disciplines of Basic Computing and Linear Dynamical Analysis.

Social Engineering Activities

Litro de Luz (Liter of Light): Volunteer *2017-Ongoing*

Works on the technology and Operations area of NGO Liter of Light, that builds sustainable and affordable plastic bottle lights for marginalized communities. In 2018 I was able to spend a week camped at a remote traditional Brazilian community of African descent (the Quilombolas - Kalungas) and we could install over 200 solutions and empower many families.

UnBeatables – Humanoid Robot Soccer: Social Activities: Team Leader *2015-2016*

From 2015 The UnBeatables Team started to also engage in social activities. We started visiting schools, children hospitals and science fairs where we showcase our robot and try to inspire kids to follow STEM careers in their future. In this process, the team also tries to bring to the children fun activities with the NAO robot.

Publications

Peer-Reviewed Conferences

C. M. Farias, L. F. C. Figueredo and J. Y. Ishihara. Performance Study on dqRNEA - A Novel Dual Quaternion based Recursive Newton-Euler Inverse Dynamics Algorithms In *2019 IEEE Third International Conference on Robotic Computing (IRC)*, 2019 (Submitted).

C. M. Farias, Y. G. Rocha, L. F. C. Figueredo and M. C. Bernardes. Design of singularity-robust and task-priority primitive controllers for cooperative manipulation using dual quaternion representation. In *2017 IEEE 1st Conference on Control Technology and Applications (CCTA)*, Mauna Lani, HI, 2017, pp. 740-745. doi: 10.1109/CCTA.2017.8062550.

C. M. Farias, F. M. Dalosto, Y. G. Rocha, and M. C. Bernardes. Estudo de Viabilidade do Framework ROS para futebol de Robôs com a Plataforma NAO (Viability Study of the ROS Framework Applied to Robot Soccer Using the NAO Platform). In *2016 I BRAHUR: Brazilian Humanoid Robot Workshop*, 2016.

Others

C. M. Farias, M. Bernardes. Controle de robô humanóide para interação colaborativa com seres humanos (Control of Humanoid Robot for Colaborative interaction With Humans). *22nd Congresso de Iniciação Científica da UnB and 13th Congresso de Iniciação Científica do DF*, 2016.

Languages

Portuguese: Native **English:** Fluent **French:** Intermediate

Programmig Skills

C++ **Python** **ROS** **Matlab**

OpenCV **HTML,CSS,JavaScript** **LaTeX**