Wilder Lopes

Electrical Engineer, M.S.

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I am an Electrical Engineer, M.S., and a Ph.D. student at the Signal Processing Laboratory of the University of Sao Paulo, Brazil. From May 2014 till May 2015, I was a visiting researcher at the Chair of Media Technology of the Technical University Munich (TU Munich), Germany. My research area is signal processing, focusing on adaptive filtering. My interests include multimedia signal processing, computer vision, artificial intelligence, machine learning, stochastic modelling, applied mathematics, and hardware implementation of algorithms.

Education

Degrees

2012–on course **Doctorate (Ph.D.) in Electrical Engineering**, *University of Sao Paulo*, Sao Paulo, SP - Brazil.
Dissertation: Geometric Algebra Adaptive Filters.

2010–2012 **M.S. in Electrical Engineering**, *University of Sao Paulo*, Sao Paulo, SP - Brazil.
Thesis: Incremental Strategies in Combination of Adaptive Filters.

2003–2008 **B.S. in Electrical Engineering**, *Federal University of Bahia*, Salvador, BA - Brazil.
Final Work: Digital Audio Signal Processing Using Wavelet Transform (in Portuguese).

Complementary Courses

2012 **CLTP 3 - CanSat Leader Training Program**, *Tokyo Metropolitan University*, Tokyo - Japan.
5 weeks course on picosatellites. Construction and test of a Can Satellite (CanSat) with fully functional circuitry.

2008–2009 **Analog and Mixed-Signal IC Design**, *CTI Renato Archer*, Campinas, SP - Brazil.
IC Brazil specialization course (6 months) on design of integrated circuits supported by Cadence Design Systems.

Experience

2014–2015 **Visiting Researcher**, *TU Munich*, Munich, Germany.
Year-long research stay. Design of adaptive-filtering algorithms for computer-vision applications, particularly for 3D registration of point clouds, using the Point Cloud Library (PCL).

2009–2010 **Mixed-Signal IC Engineer**, *LSITec*, Sao Paulo, SP - Brazil.
Design of analog and mixed-signal integrated circuits. Some circuits/blocks designed: Digital-to-Analog converters (DAC), Operational amplifiers, Frequency oscillators.

2007–2008 **Internship in Audio Engineering**, *Audium*, Salvador, BA - Brazil.
Design, simulation, and installation of electro-acoustics systems.

2007–2007 **Internship in Electronic Engineering**, *Squadra*, Salvador, BA - Brazil.
Design of communication hardware (RS-232, RS-485, fiber optic) and embedded systems.

Doctoral (Ph.D.) Dissertation - on course

title *Geometric Algebra Adaptive Filters*

supervisors Prof. Cassio Guimaraes Lopes, Ph.D. and Prof. Dr.-Ing. Eckehard Steinbach

description My research is focused on exploiting Geometric (Clifford) Algebra theory – which generalizes linear algebra and vector calculus for hypercomplex variables – in order to devise new adaptive filtering strategies. Two papers containing theoretical and practical results have been submitted and are currently under review.

Master's thesis

title *Incremental Strategies in Combination of Adaptive Filters*

supervisor Prof. Cassio Guimaraes Lopes, Ph.D.

description In this work a new strategy for combination of adaptive filters is introduced and studied. Inspired by incremental schemes and cooperative adaptive filtering, the standard convex combination of parallel-independent filters is rearranged into a series-cooperative configuration, while preserving computational complexity.

Publications

- Lopes, Wilder B.; Al-Nuaimi, Anas; Lopes, Cassio G. "*Geometric-Algebra LMS Adaptive Filter and its Application to Rotation Estimation*" - IEEE Signal Processing Letters (Accepted for publication). Preprint on arxiv.org, arXiv:1601.06044
- Al-Nuaimi, Anas; Lopes, Wilder B.; Steinbach, Eckehard; Lopes, Cassio G. "*6DOF Point Cloud Alignment using Geometric Algebra-based Adaptive Filtering*" - IEEE WACV 2016 - Lake Placid, NY, USA.
- Lopes, Wilder B.; Lopes, Cassio G. "*Incremental Combination of RLS and LMS Adaptive Filters in Nonstationary Scenarios*" - IEEE ICASSP 2013 - Vancouver, Canada.
- Chamon, Luiz F. O.; Lopes, Wilder B.; Lopes, Cassio G. "*Combination of adaptive filters with coefficients feedback*" - IEEE ICASSP 2012 - Kyoto, Japan.
- Lopes, Wilder B.; Lopes, Cassio G. "*Incremental-cooperative strategies in combination of adaptive filters*" - IEEE ICASSP 2011 - Prague, Czech Republic.

Computer skills

Programming: Matlab, Python, C/C++, Java, HTML, CSS

Writing: LaTex, MS Office

Other: Point Cloud Library (PCL), Git, svn, CMake

IDE: Qt Creator, Processing, Cadence

O.S.: Linux, Windows

Hardware: Raspberry Pi, BeagleBone Black, Texas Instruments MSP430.

Languages

Portuguese	**Native**	
English	**Fluent**	
German	**Intermediate**	*B1 level according to the Common European Framework*
Spanish	**Basic**	*Good reading and comprehension skills*

Conferences and Workshops

IEEE WACV 2016, *IEEE Winter Conference on Applications of Computer Vision - Poster and Oral Presentation. On March 7-9 2016, in Lake Placid, NY, USA.*

IEEE ICASSP 2013, *IEEE International Conference on Acoustics, Speech and Signal Processing - Poster Presentation. On May 26-31 2013, in Vancouver, BC, Canada.*

Noshiro Space Event, *Poster presentation: "An Overview of the Research Activities in the Signal Processing Laboratory at USP" - On August 15-23 2012, in Noshiro, Akita, Japan.*

IEEE ICASSP 2012, *IEEE International Conference on Acoustics, Speech and Signal Processing - Poster Presentation. On March 25-30 2012, in Kyoto, Japan.*

IEEE ICASSP 2011, *IEEE International Conference on Acoustics, Speech and Signal Processing - Poster Presentation. On May 22-27 2011, in Prague, Czech Republic.*

Grants and Awards

IEEE, Student Travel Grant, *March 2016 - IEEE WACV 2016, Lake Placid, NY, USA.*

CAPES-PDSE, under grant number BEX 14601/13-3, *From May 2014 to May 2015 - Research stay at TU Munich.*

CAPES-DS, Programa de Demanda Social, *From March 2012 to March 2014, and from June 2015 to February 2016 - Doctorate (Ph.D.) scholarship.*

PRPG-USP, Travel Grant, *From October 2013 to November 2013 - Research stay at TU Munich.*

IEEE, Signal Processing Society Travel Grant, *May 2013 - IEEE ICASSP 2013, Vancouver, Canada.*

IEEE, Signal Processing Society Travel Grant, *March 2012 - IEEE ICASSP 2012, Kyoto, Japan.*

PRPG-USP, Travel grant, *May 2011 - IEEE ICASSP 2011 conference.*

CAPES-DS, Programa de Demanda Social, *From March 2010 to February 2012 - Master's scholarship.*