



Tanis Mar Hernández

Early stage researcher and engineer with a passion for machine learning and its interface with neuroscience and robotics.



PERSONAL INFO

Date of Birth: 23.09.1984
Place of Birth: Soria, Spain
Residence: Genova, Italy
Nationality: Spanish
Driver's license: Class B



LANGUAGES

Spanish
English
Italian
German
French

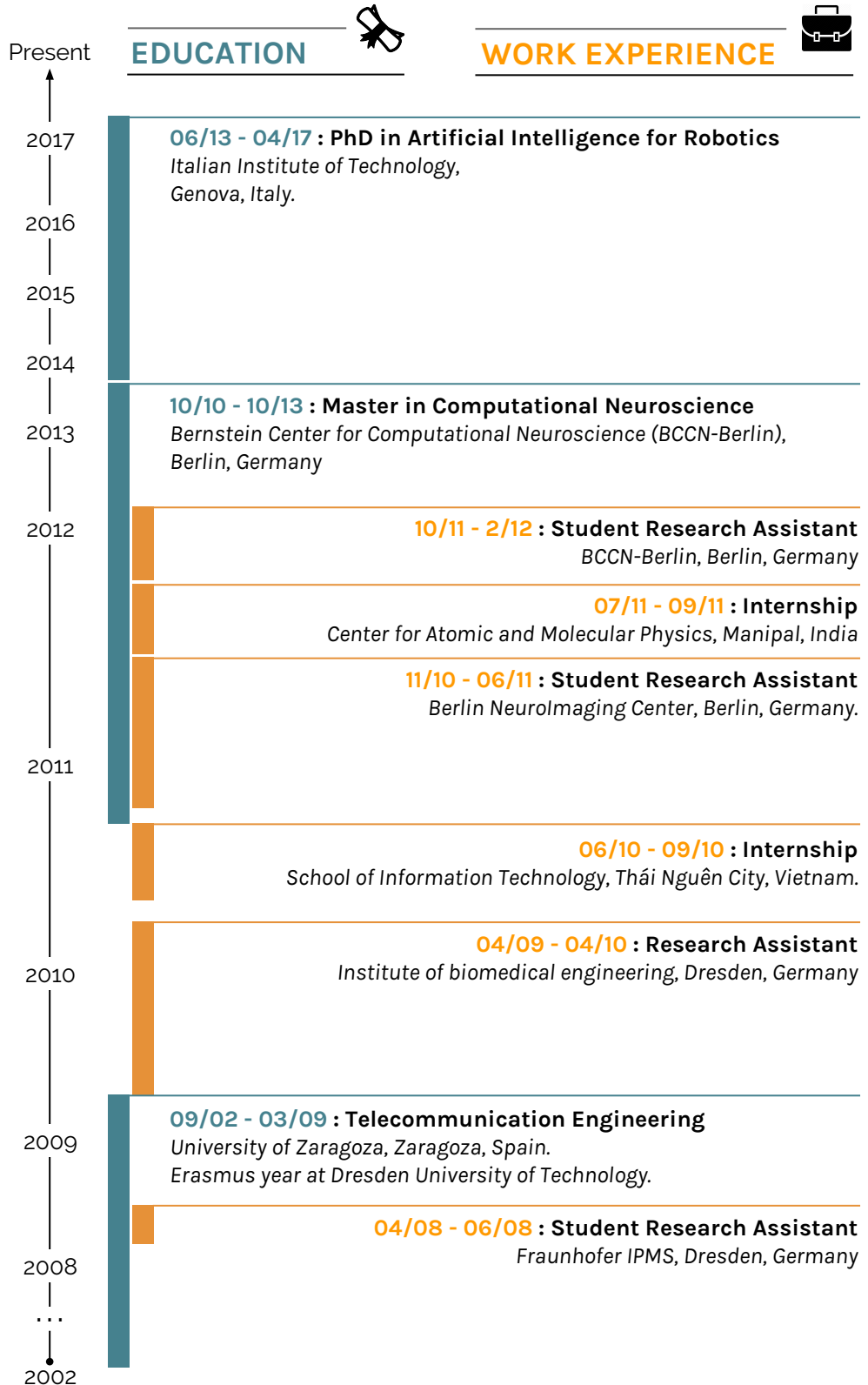


PROGRAMMING SKILLS

MATLAB
C++
Python
LaTeX



HOBBIES



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Detailed Information

ACADEMIC EDUCATION

06/2013 - 04/2017

PhD in Artificial Intelligence for Robotics

Italian Institute of Technology, Genova, Italy.

Topic: Affordances for and from manipulation; A developmental approach to tool use learning on Cub.

Tasks:

- + Development of cognitive architectures for self-supervised tool affordance learning:
 - Implementation of exploratory behaviors in iCub to discover affordances.
 - Realization of segmentation and tracking algorithms in 2D and 3D to discriminate tools and target objects.
 - Implementation of vision algorithms for tool feature extraction, using openCV and PCL.
 - Application of Machine Learning techniques, including deep learning, support vector machines, self-organized maps, regression, K-means, etc, in order to learn the correlation between tool's features and the effects they achieved during exploration.
- + Preparation and execution of experimental setups with the iCub humanoid robot
- + Implementation of iCub demos for visitors, press or TV, at IIT and abroad.

10/2010 - 10/2013

International Master in Computational Neuroscience

Bernstein Center for Computational Neuroscience, Berlin (BCCN-Berlin), Germany

Master's Thesis: Neurobiologically inspired computational models of extended sensorimotor contingencies for robot control. *UKE, Hamburg.*

+ **Topic:** Apply recurrent neural network paradigms in order to model the action-perception loop for robot control.

Lab Rotations:

- + Refinement and extension of body-map approaches, *Humboldt University, Berlin, Germany.*
 - **Task:** Merging the RIAC artificial curiosity algorithm with Olsson's Information Theory approach to body map generation to obtain a Curiosity Driven Motor Babbling algorithm.
- + Standard sensor space representations for robust BCI, *ATR laboratories, Kyoto, Japan*
 - **Task:** Standardization of VBMEG data and comparison with non-standardize data. Development of BCI appliance selector based on P300 wave.
- + Virtual hand experiments to study of sensorimotor contingencies in humans. *UKE, Hamburg, Germany.*
 - **Task:** Perform an experiment for the study of synchronization perception in humans

09/2002 - 03/2009

Telecommunication Engineering

University of Zaragoza, Zaragoza, Spain

Master's Thesis: Classification of ECG: A neural network approach for a wearable device. *Fraunhofer IPMS, Dresden*

Erasmus year at Dresden University of Technology

Detailed Information

PUBLICATIONS

- ??/2017** **What can I do with this tool? Self-supervised learning of tool affordances from their 3D geometry.** T. Mar, V. Tikhanoff, L. Natale. IEEE Transactions on Cognitive and Developmental Systems (accepted).
- 05/2017** **Self-supervised learning of tool affordances from 3D tool representation through parallel SOM mapping.** T. Mar, V. Tikhanoff, L. Natale. Robotics and Automation (ICRA), 2017 IEEE International Conference on. (accepted).
- 10/2015** **Multi-model approach based on 3D functional features for tool affordance learning in robotics.** T. Mar, V. Tikhanoff, G. Metta, L. Natale. Humanoid Robots (Humanoids), 2015 15th IEEE-RAS International Conference on.
- 09/2015** **Enabling Depth-driven Visual Attention on the iCub Humanoid Robot: Instructions for Use and New Perspectives.** G. Pasquale, T. Mar, C. Ciliberto, L. Rosasco, L. Natale. Frontiers in Robotics and AI.
- 05/2015** **Self-supervised learning of grasp dependent tool affordances on the iCub Humanoid robot.** T. Mar, V. Tikhanoff, G. Metta, L. Natale. Robotics and Automation (ICRA), 2015 IEEE International Conference on.
- 08/2011** **Optimization of ECG classification by means of feature selection.** T. Mar, S. Zauseder, JP Martínez, M Llamedo, R Poll. IEEE Transactions on Biomedical Engineering. Vol. 58, No. 8.

WORK EXPERIENCE

- 10/2011 - 02/2012** **Student Research Assistant, BCCN-Berlin, Berlin, Germany.** Experimental set-up for modeling human decision-making processes.
- 07/2011 - 09/2011** **Trainee (IAESTE), Manipal Institute of Technology, Manipal, India.** Non-linear multi-class classification algorithms for early diagnosis of cancer based on blood serum protein profiles.
- 11/2010 - 07/2011** **Student Research Assistant, Berlin NeuroImaging Center, Berlin, Germany.** Implementation an interface to integrate the output of a near-infrared spectroscopy brain imaging system into an EEG-based BCI toolbox
- 06/2010 - 09/2010** **Trainee (IAESTE), School of Information Technology, at Thái Nguyên University, Vietnam.** Simulation in MATLAB of partial differential equations approximations by means of cellular neural networks.
- 04/2009 - 01/2010** **Research Assistant, Institute of biomedical engineering, at Dresden University of Technology, Germany.** Development of e-learning content. Feature selection and classification for heartbeat discrimination
- 04/2008 - 06/2008** **Student Research Assistant, Lifetronics department, at Fraunhofer IPMS, Dresden, Germany.** Research on ECG classification, neural network paradigms, and wearable devices.