

# Felipe Trevizan

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## Education

Ph.D., Machine Learning, Carnegie Mellon University, August 2013  
*Thesis title:* Short-Sighted Planning under Uncertainty  
*Advisor:* Prof. Manuela Veloso

M.S., Machine Learning, Carnegie Mellon University, 2010  
*Dissertation title:* Learning Opponent's Strategies in the RoboCup Small-Size League  
*Advisor:* Prof. Manuela Veloso

M.S., Computer Science, So Paulo University, 2006  
*Dissertation title:* An Unified Model for Planning under Uncertainty  
*Advisor:* Prof. Leliane Nunes de Barros

B.S., Computer Science, So Paulo University, 2004  
*Dissertation title:* Cognitive Robotics: an Application of Planning with Incomplete Information  
*Advisor:* Prof. Leliane Nunes de Barros

## Publications

### Refereed Journals Papers

Guilliard, I. and Sanner, S. and Trevizan, F. and Williams, B. (2016) A Non-homogeneous Time Mixed Integer LP Formulation for Traffic Signal Control. In *Transport Research Record (TRR): Journal of the Transport Research Board*, 128–138 (**Best Paper Award from the AI committee of TRB**)

Santos, F. and Barros, L. N. and Trevizan, F. (2015) Reachability-based Model Reduction for Markov Decision Process. In *Journal of the Brazilian Computer Society*, 1265:1–5

Trevizan, F. and Veloso, M. (2014) Depth-based Short-sighted Stochastic Shortest Path Problems. In *Artificial Intelligence*, 216:179–205

Trevizan, F. and Barros, L. N. (2006) Robótica Cognitiva: programação baseada em lógica para controle de robôs. In *Controle & Automação*.

Trevizan, F. and Barros, L. N. and Correa da Silva, F. S. (2006) Designing Logic-based Robots. In *Inteligencia Artificial, Revista Iberoamericana de Inteligencia Artificial*, 10:11–22

### Refereed Conferences Papers

Trevizan, F. and Thiébaux, S. and Haslum, P. (2017) Occupation Measure Heuristics for Probabilistic Planning. In *Proc. of 27th Int. Conf. on Automated Planning and Scheduling (ICAPS)*. (**Best Paper Award**)

Trevizan, F. and Teichtel-Königsbuch, F. and Thiébaux, S. (2017) Efficient Solutions for Stochastic Shortest Path Problems with Dead Ends. In *Proc. of 33rd Int. Conf. on Uncertainty in Artificial Intelligence (UAI)*.

Baumgartner, P. and Thiébaux, S. and Trevizan, F. (2017) Tableaux for Policy Synthesis for MDPs with PCTL\* Constraints. In *Proc. of 26th Int. Conf. on Automated Reasoning with Analytic Tableaux and Related Methods (TABLEAUX)*.

Trevizan, F. and Thiébaux, S. and Santana, P. and Williams, B. (2017) I-dual: Solving Constrained SSPs via Heuristic Search in the Dual Space. In *Proc. of the 26th Int. Joint Conf. on AI (IJCAI)*.

Trevizan, F. and Thiébaux, S. and Santana, P. and Williams, B. (2016) Heuristic Search in Dual Space for Constrained Stochastic Shortest Path Problems. In *Proc. of 26th Int. Conf. on Automated Planning and Scheduling (ICAPS)*. **(Best Paper Award)**

Trevizan, F. and Veloso, M. (2013) Finding Objects through Stochastic Shortest Path Problems. In *Proc. of 12nd Int. Conf. on Autonomous Agents and Multiagent Systems (AAMAS)*.

Trevizan, F. and Veloso, M. (2012) Trajectory-Based Short-Sighted Probabilistic Planning. In *In Advances in Neural Information Processing Systems (NIPS)*.

Trevizan, F. and Veloso, M. (2012) Short-Sighted Stochastic Shortest Path Problems. In *Proc. of 22nd Int. Conf. on Automated Planning and Scheduling (ICAPS)*.

Shirota Filho, R. and Cozman, F. G. and Trevizan, F. and de Campos, C. P. and Barros, L. N. (2007) Multilinear and Integer Programming for Markov Decision Processes with Imprecise Probabilities. In *Proc. of the 5th Int. Symposium On Imprecise Probability: Theories And Applications*.

Trevizan, F. and Cozman, F. G. and Barros, L. N. (2007) Planning under Risk and Knightian Uncertainty. In *Proc. of the 20th Int. Joint Conf. on AI (IJCAI)*.

Trevizan, F. and Cozman, F. G. and Barros, L. N. (2006) Unifying Nondeterministic and Probabilistic Planning through Imprecise Markov Decision Processes. In *Proc. the 10th Ibero-American Conf. on AI (IBERAMIA) and 18th Brazilian AI Symposium (SBIA)*. **(Best Paper Award)**

Trevizan, F. and Barros, L. N. and Correa da Silva, F. S. (2005) Low Cost Experiments in Cognitive Robotics for Planning in Hostile Environments with Incomplete Information. In *Proc. of the 11th Conf. of the Spanish Association for Artificial Intelligence (CAEPIA)*.

Trevizan, F. and Barros, L. N. (2005) Robótica Cognitiva: uma aplicação de planejamento com informação incompleta. In *Proc. of the 7th Simpósio Brasileiro de Automação Inteligente (SBAI)*.

### Refereed Workshop Papers

Trevizan, F. and Veloso, M. (2010) Learning Opponent's Strategies in the RoboCup Small-Size League. In *Proc. of AAMAS'10 Workshop on Agents in Real-time and Dynamic Environments*.

Trevizan, F. and Cozman, F. G. and Barros, L. N. (2008) Mixed Probabilistic and Nondeterministic Factored Planning through Markov Decision Processes with Set-valued Transitions. In *Proc. of ICAPS'08 Workshop on A Reality Check for Planning and Scheduling Under Uncertainty*.

### Research Projects

#### Short-Sighted Planning under Uncertainty (2010-2013)

Development of new algorithms to solve planning under uncertainty problems that are able to scale up while still offering formal guarantees with respect to the obtained solutions such as optimality and replanning frequency. In order to develop such algorithms, we introduce short-sighted probabilistic planning, a novel approach to effectively solve planning and execution of probabilistic problems. This approach incrementally generates short-sighted subproblems by limiting the probabilistic planning

state space and elsewhere heuristically aiming at the set of goals.

#### **Learning Opponent's Strategies in the RoboCup Small-Size League (2009-2010)**

Proposed a similarity function to compare two teams, and consequently their strategies, by the ability of one team to mimic the behavior of the other. Used the proposed function to classify opponents as well as to decompose an unknown opponent as a combination of known opponents. This approach was applied in real world data from the RoboCup Small Size League collected during the RoboCup 2007, RoboCup 2008 and USOpen 2009 to classify opponent's defense strategies.

#### **An Unified Model for Planning under Uncertainty (2004-2006)**

Investigation of decision-theoretic planning models under risk, Knightian uncertainty and the continuum between them. Development of an unified planning model to represent any problem in this continuum, in which the extremes are nondeterministic planning and probabilistic planning.

#### **Cognitive Robotics: an application of planning with incomplete information (2003-2004)**

Development of a software and a robotic agent to solve a search and rescue problem through planning and the concepts of Cognitive Robotics: to program agents using explicitly only high-level actions and relations among actions characterized as formal logical statements.

#### **Fellowships, Honors, and Awards**

2017, Best Paper Award at 27th International Conference on Automated Planning and Scheduling (ICAPS).

2016, Best Paper Award at 26th International Conference on Automated Planning and Scheduling (ICAPS).

2016, Best Paper Award from the Artificial Intelligence committee of the Transport Research Board (TRB).

2013–2014, Postdoctoral Fellowship from the So Paulo State Research Foundation (FAPESP).

2007–2013, Scholarship from Carnegie Mellon University (CMU) for Doctorate degree.

2006, Fellowship from the Brazilian Coordination for the Improvement of Higher Level Personnel (CAPES) for Doctorate degree.

2006, Best Paper Award (Premio Jos Negrete) at 2nd International Joint Conference: 10th Ibero-American Conference on AI (IBERAMIA), 18th Brazilian AI Symposium (SBIA).

2005–2006, Fellowship from the Brazilian National Council for Scientific and Technological Development (CNPq) for Masters degree.

2003–2004, Research Experience for Undergraduates (REU) Fellowship from the So Paulo State Research Foundation (FAPESP).

#### **Teaching**

Teaching Assistant, Graduate Artificial Intelligence, Carnegie Mellon University, Spring 2012.

Teaching Assistant, Probabilistic Graphical Models, Carnegie Mellon University, Fall 2010.

Teaching Assistant, Undergraduate Introduction to Computer Science, University of So Paulo University, Spring 2006.

Instructor, Basic informatics course, Mahatma Gandhi NGO, So Paulo, Brazil, 2002 – 2003.

## **Professional Experience**

### **Google Seattle-Kirkland (2011)**

Developed a new feature selection algorithm based on approximations of conditional mutual information between sets of features. The algorithm was implemented using MapReduce and tested in large scale sparse datasets (approximately  $10^6$  instances with  $10^8$  features). As of Fall 2013, this algorithm is being used by Google in its products.

### **Google Pittsburgh (2010)**

Developed a new regularization algorithm for one of Googles multipurpose machine learning system. The algorithm performs regularization by dynamically changing its learning rate.