Héctor Palacios

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- Create and understand AI by focusing on the ***interplay*** between technology, humans and their situations.
- Work in AI problems with ***structured*** outputs given data and/or description of business and context.
- Research in AI algorithms that use existing algorithms and components for simpler AI problems.

EDUCATION

PHD, COMPUTER SCIENCE
Advisor: Prof. Hector Geffner
Universitat Pompeu Fabra
Dec 2009 | Barcelona/Spain

BS & MS, COMPUTER SCIENCE
Universidad Simón Bolívar, Venezuela

ACADEMIC WORK

• Collaborated on academic research leading to 20+ publications. (See list in next pages)
• Organized three workshops at top AI conferences, including ICAPS-2020 on Planning and Reinforcement Learning.
• Reviewed hundreds of articles submitted to top AI conferences (AAAI, IJCAI, ICAPS) and journals (AIJ, JAIR, KBS, ACM-TIST). SPC for IJCAI 2021.
• Influenced the AI planning community by helping to popularize the translation-based approach.

ACTIVISM / LEADERSHIP

• Stimulated, coordinated and enabled online activism for data crowdsourcing during natural disasters and elections.

PROGRAMMING

Extensive experience with • Python • Java • C / C++ • Functional languages • Linux • Computer clusters • Docker • Version control.

COMMUNICATION

• Presented original research at conferences. (See list in next pages).
• Invited to talks at Nasa Ames, Univ of Amsterdam, Univ of Sao Paulo.
• Lectured hundreds of hours to groups of up to 130 students on AI, logic, and computational logic.

TRAINING

Summer schools: • Deep learning 2017 • Reinforcement learning 2017.

LANGUAGES

• English: professional.
• Spanish: native.
• French: elementary.

INDUSTRIAL ARTIFICIAL INTELLIGENCE

ELEMENT AI | Applied Research Scientist
Sep 2018 – present | Montreal, Canada

- Continuous dedication to ***NeuroSymbolic*** methods since June 2019.
- Started with approval for a short-term project on using ***reasoning on top of a ML model***. Without additional training, achieved double-digit absolute improvement in hard cases of a vision-related task, without losing good performing cases of the pure ML-based model.
- Consulted for internal customers and products about their ***AI strategy***.
- ***Question answering*** by mapping natural language into ***structured queries***. Clarified the scope for balancing expressivity and performance. Motivated and collaborated in development of ***AI-based curation*** of labelled data for the consensus of the crowd could be wrong.

NUANCE COMMUNICATIONS | Senior Research Scientist
Nov 2016 – Sep 2018 | Montreal, Canada

- Detect intent similarity of natural language utterances by training Siamese Network using abundant dense data. Implemented in TensorFlow. Delivered technical report recommending AI roadmap for the feature.
- Question answering on domain-specific content and no labelled data. Took ownership of project. Clarified evaluation and scope of the existing solution. Proposed methodology and aligned with internal customers. Used • Information retrieval • Word embeddings • Ontologies.

ACADEMIC ARTIFICIAL INTELLIGENCE

REASONING / SYMBOLIC AI | Given a description of the problem

- Central approach: translate AI problems into simpler AI ones.
- Solved rich sequential decision making problems featuring possible scenarios and effects of actions and observations.
- Used logic / probabilistic reasoning, compilation to logical circuits, combinatorial optimization, and search.

EMPIRICAL | Think, code, measure, analyze, repeat, report

- Designed and ran hundreds of experiments over hundreds of problems.
- Programmed complex algorithms, requiring millions of object instances.
- Turned empirical observations into theoretical results, and vice versa.

RESEARCH AWARDS | Papers & Competitions

- IJCAI-JAIR Best Paper Prize 2012 to an "outstanding paper published in JAIR in the preceding five calendar years".
- Dissertation Awards by the European C. Committee for AI (ECCAI) and the Int. Conference on Automated Planning and Scheduling (ICAPS).
- Winner of the Conformant track of the 5th International Planning Competition 2006 for # of problems solved given time limit.

ACADEMIC HISTORY

UNIVERSITAT POMPEU FABRA | Visiting Professor
Jan 2013 – Dec 2015 | Barcelona, Spain

UNIV. CARLOS III DE MADRID | Postdoctoral Scholar
Dec 2010 – Dec 2012 | Madrid, Spain

UNIVERSIDAD SIMÓN BOLÍVAR | Assistant Professor
2008 – 2010 | Caracas, Venezuela

PUBLICATIONS

PHD THESIS

- H Palacios. Translation-based approaches to Conformant Planning. Supervised by Prof. Hector Geffner. Dec 2009. Barcelona, Spain.
  - Honourable Mention at the 2009 Artificial Intelligence Dissertation Award by the European Coordinating Committee for AI (ECCAI).
  - 2010 Best Dissertation Award by the International Conference on Automated Planning and Scheduling (ICAPS).

JOURNAL ARTICLES

- V. Agrawal, J. Baier, K. Bekris, Y. Chen, A.S. d'Avila Garcez, P. Hitzler, P. Haslum, D. Jannach, E. Law, F. Lecue, L.C. Lamb, C. Matuszek, H. Palacios, B. Srivastava, L. Shastri, N. Sturtevant, R. Stern, S. Tellex, S. Vassos. Reports of the AAAI 2012 Conference Workshops. AI Magazine. 33(4): 119-126 (2012). ISSN 0738-4602.
- H. Palacios and H. Geffner. Compiling Uncertainty Away in Conformant Planning Problems with Bounded Width. Journal of Artificial Intelligence Research (JAIR). 35: 623-765. 2009. ISSN 1076-9757.
  - IJCAI-JAIR Best Paper Prize 2012 to an "outstanding paper published in JAIR in the preceding five calendar years".

PATENTS

- Preparing two patent applications combining machine learning and reasoning methods. Sep 2020.
- M. B. Do, H. Palacios, R. Zhou, L. Kuhn, J. de Kleer. Methods and Systems for Active Diagnosis through Logic-based Planning. Patent US8145334. Issue date: 27 Mar 2012.
  - During internship at PARC (formerly Xerox PARC).

EDITOR

- Papers from the 2012 AAAI Workshop "Problem Solving Using Classical Planners". H. Palacios, P. Haslum, J. Baier. 98 pp. 2012. ISBN 978-1-57735-577-9.
- Proceedings of the ICAPS'10 workshop on Planning and Scheduling Under Uncertainty (13 May 2010), Bidot J., Bryce D., Buffet O., Palacios H., Sanner S. (Editors). 2010.

REFEREED CONFERENCE ARTICLES

- K. Fernandes, J.S. Cardoso, H. Palacios. Learning and Ensembling Lexicographic Preference Trees with Multiple Kernels. 2016 International Joint Conference on Neural Networks (IJCNN 2016).
- S. Jimenez, A. Jonsson, H. Palacios. Temporal Planning With Required Concurrency Using Classical Planning. 25Th International Conference on Automated Planning and Scheduling (ICAPS). Jerusalem, Israel. June 7-11, 2015.
- C. Boutilier, J. Lang, J. Oren, H. Palacios. Robust Winners and Winner Determination Policies under Candidate Uncertainty. Twenty-Eighth AAAI Conference on Artificial Intelligence (AAAI). July 27-31, 2014. Québec, Canada.
- A. Albore, H. Palacios and H. Geffner. Compiling Uncertainty Away in Non-Deterministic Conformant Planning. European Conference on Artificial Intelligence (ECAI), p. 465-470. ISBN 978-1-60750-605-8. Lisbon, Portugal, August 16-20, 2010.
- J. Hoffmann, N. Fates, H. Palacios. Brothers in Arms? On AI Planning and Cellular Automata. European Conference on Artificial Intelligence (ECAI). p. 223-228. ISBN 978-1-60750-605-8. Lisbon, Portugal. August 16-20, 2010.
- B. Bonet, H. Palacios and H. Geffner. Automatic Derivation of Finite-State Machines for Behavior Control (Nectar Track). 24th AAAI conference on Artificial Intelligence (AAAI), p. 1656-1659. ISBN 978-1-57735-463-5. Atlanta, Georgia, USA, July 11-15, 2010
- B. Bonet, H. Palacios and H. Geffner. Automatic Derivation of Memoryless Policies and Finite-State Controllers Using Classical Planners. 19th International Conference on Automated Planning and Scheduling (ICAPS), p. 34-41. ISBN 978-1-57735-406-2. Thessaloniki, Greece, September 19-23, 2009.
- A. Albore, H. Palacios and H. Geffner. A Translation-based Approach to Contingent Planning. Int. Joint Conf. on Artificial Intelligence (IJCAI), p. 1623-1628. ISBN 978-1-57735-426-0. Pasadena, California, USA, July 11-17, 2009.
- A. Albore, H. Palacios and H. Geffner. Fast and Informed Action Selection for Planning with Sensing. In Current Topics in Artificial Intelligence, vol 4788/2007. Selected papers of the 12th Conference of the Spanish Association for Artificial Intelligence (CAEPIA), p. 1-10. ISBN: 978-3-540-75270-7. Salamanca, España. November 12-13, 2007.
- H. Palacios and H. Geffner. From Conformant into Classical Planning: Efficient Translations That May be Complete Too. In Proceedings of the 17th International Conference on Automated Planning and Scheduling (ICAPS), p. 264-271. ISBN 978-1-57735-344-7. Providence, Rhode Island, USA, September 22-26, 2007.
  - Best Student Paper Award at ICAPS 2007.
- H. Palacios and H. Geffner. Compiling Uncertainty Away: Solving Conformant Planning Problems Using a Classical Planner (Sometimes). In Proceedings of the 21st National Conference on Artificial Intelligence (AAAI), p. 900-905. ISBN 978-1-57735-281-5. , Boston, Massachusetts, USA, July 16-20, 2006.
- H. Palacios and H. Geffner. Mapping Conformant Planning into SAT through Compilation and Projection. In Lecture Notes in Computer Sciences, vol 4177/2006. Selected papers of the 11th Conference of the Spanish Association for Artificial Intelligence (CAEPIA), 2005. p. 311-320. ISBN 3-540-45914-6. Santiago de Compostela, España, November 16-18, 2005.

  - Best Paper Finalist at CAEPIA 2005.

- H. Palacios, B. Bonet, A. Darwiche, H. Geffner. Pruning Conformant Plans by Counting Models on Compiled d-DNNF Representations. In Proceedings of the 15th International Conference on Automated Planning and Scheduling (ICAPS), 2005. p 141-150. ISBN 978-1-57735-220-4. Monterey, California, USA. June 5-10 2005.
- H. Palacios and H. Geffner. Planning as Branch and Bound: A Constraint Programming Implementation. In Proceedings of the 28th Latin-American Conference on Informatics (infoUYclei), 2002. p. 239-251. ISBN 9974-7704-1-6. Montevideo, Uruguay, November 25-29 2002.

REFEREED WORKSHOPS ARTICLES

- D. Furelos-Blanco,A. Jonsson, H. Palacios, S. Jimenez. Forward-Search Temporal Planning with Simultaneous Events. ICAPS Workshop on Constraint Satisfaction Techniques for Planning and Scheduling, 2018.
- H. Palacios, A. Albore, H. Geffner. Compiling Contingent Planning into Classical Planning: New Translations and Results. In Proceedings of the Workshop "Models and Paradigms for Planning under Uncertainty: a Broad Perspective", ICAPS 2014.
- C. Boutilier, J. Lang, J. Oren, H. Palacios. Robust Winners and Winner Determination Policies under Candidate Uncertainty. Fourth International Workshop on Computational Social Choice, 2012.
- H. Palacios and H. Geffner. Compiling Uncertainty Away: Solving Conformant Planning Problems Using a Classical Planner (Sometimes). In Proceedings of the Workshop on Planning Under Uncertainty and Execution Control for Autonomous Systems, ICAPS 2006.
- H. Palacios and H. Geffner. Mapping Conformant Planning into SAT through Compilation and Projection. In Proceedings of the 1st International Workshop on Quantification in Constraint Programming held during the International Conference on Principles and Practice of Constraint Programming (CP), 2005.