Ariadna Quattoni

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Personal Information

Name	Ariadna Quattoni
Date of birth	28 August 1980
Place of birth	Rosario (Santa Fe, Argentina)
Nationality	Argentinian-Italian
Homepage	`http://www.lsi.upc.edu/~aquattoni`
Email	`ariadna.quattonii@gmail.com`
Total Citations (google schoolar)	5894
Index-h	17
Index i10	24

Research Interests

My main research area is Machine Learning with a focus on latent variable models for structured prediction. I have worked in several applications including Computer Vision and Natural Language Processing. In the latter years I have focused on the study of practical and robust methods for learning non-deterministic weighted automata and grammars which are a subclass of Recurrent Neural Networks. I have applied these methods to structured prediction problems in NLP: such as: sequence tagging, supervised parsing and grammatical inference. More recently, I have started to work on interactive machine learning algorithms that optimize the collaboration between the human teacher and the automated system.

Education

- **Doctor by Massachussets Institute of Technology.** June 2009.
  Dissertation: *Transfer Learning Algorithms for Image Classification*
  Advisors: Michael Collins and Trevor Darrell
  Ph.D. in Computer Science., Massachussets Institute of Technology (MIT)
- **Master of Science in Electrical Engineering and Computer Science**. June 2005.
  Massachussets Institute of Technology (MIT)
- **(Summa Cum Laude) B.A. in Computer Science**. June 2003.
  Mount Holyoke College.

Current Position

- **Since March 2020**: Principal Research Scientist at Technical University of Catalonia (UPC), Computer Science Department. Funding: ERC Starting Grant: INTERACT.

Past Positions

- **2018-2020**: Research Scientist and CTO at dMetrics, a New York based company developing the next generation of AI and interactive learning tools for text processing.
- **2014-2018**: Research Scientist at Xerox Research Centre Europe (XRCE).

- **2012-2014**: Research Scientist at the Technical University of Catalonia (UPC), LSI Software Department. Funding: XLike European Project.
- **2009-2012**: Research Scientist at the Technical University of Catalonia (UPC), LSI Software Department. Funding: Juan de la Cierva 2008 program, Spanish Ministry of Science and Innovation.
- **2003 – 2009 :** Research Assistant and Phd. Candidate with Prof. Michael Collins and Trevor Darrell. Massachusetts Institute of Technology (MIT), Computer Science and Artificial Intelligence Laboratory (CSAIL).

Reseach Activities

Grants and Awards

- Recipient of a Juan de la Cierva Grant, Juan de la Cierva 2008 Program.
- Joint Recipient (with Xavier Carreras and Lluis Marquez) of a Google Research Award to pursue research on the area of Natural Language Processing. June 2010.
- Joint Recipient (with PI: Emmanuel Dellandrea) VISEN, visual sense: tagging visual data with semantic descriptions, Europen Project awarded under the call ERA-NET CHIST-ERA 2011.
- Recipient of a Ramon y Cajal Grant, RyC 2013 Program.
- Received a grade of A in the Second Stage of ERC Starting Grant 2018 (fully meets the ERC's excellence criterion and is recommended for funding if sufficient funds are available).
- Recipient of an ERC Starting Grant from the European Research Council, INTERACT: Interactive Machine Learning for Compositional Models of Natural Language, ERC 2019.
- Join Recipient (with Jordi Jimenez Conde) of a Marato-TV3-Salut-CardioVascular research grant: Intel·ligència Artificial Multimodal per Optimitzar l'Acció Terapèutica en el Pacient Neurovascular Agut, Novemeber 2023.

Technology Transfer

- X. Carreras and A. Quattoni, **Prepositional phrase attachment over word embedding products**. *US Patent App. 15/454,296, 2017.*
- A. Quattoni, X. Carreras and M. Galle, **Scalable spectral modeling of sparse sequence functions via a best matching algorithm**. *US Patent App. 15/171,393, 2018.*
- Cofounder of Dmetrics Inc., an NSF funded start-up developing natural language processing technology for the analysis of internet social media content.
- Joint Recipient (with PI: Paul Nemirovsky) of NSF SBIR Phase I, Award Number: 0839290, January 2009.
- Joint Recipient (with PI: Paul Nemirovsky) of NSF SBIR Phase II, Award Number: 0956817, January 2010.
- Joint Recipient (with PI: Paul Nemirovsky) of NSF SBIR Phase I, Award Number: 1248768, December 2012.

Publications

- C. Gonzalez-Gutierrez, A. Primadhanty, F. Cazzaro, A. Quattoni **Does Fine-tuning a Classifier Help in Low-budget Scenarios? Not Much.** *Fifth Workshop on Insights from Negative Results, NAACL 2024.*
- C. Gonzalez-Gutierrez and A. Quattoni **Leveraging the Structure of Pre-trained Embeddings to Minimize Annotation Effort.** *NAACL 2024.*
- F. Cazzaro, D. Locatelli, A. Quattoni **Align and Augment: Generative Data Augmentation for Compositional Generalization.** *EACL 2024.*
- A. Primadhanty, A. Quattoni, **Entity Disambiguation on a Tight Labeling Budget.** *Findings of ACL (EMNLP 2023).*
- C. Gonzalez-Gutierrez, A. Primadhanty, F. Cazzarro, A. Quattoni, **Analyzing Text Representations by Measuring Task Alignment.** *ACL 2023.*
- F. Cazzarro, D. Locatelli, A. Quattoni, X. Carreras, **Translate First Reorder Later: Leveraging Monotonicity in Semantic Parsing.**. *Findings of ACL (EACL 2023).*
- D. Locatelli, A. Quattoni, **Measuring Alignment Bias in Neural Seq2Seq Semantic Parsers.**. *Proceedings of the Eleventh Joint Conference on Lexical and Computational Semantics (*SEM 2022).*
- F. Cazzarro, A. Quattoni, X. Carreras, **Are Deep Sequence Classifiers Good at Non-Trivial Generalization?** *Workshop on Robustness in Sequence Modeling, at NeurIPS 2022.*.
- A. Quattoni, X. Carreras, **Minimizing Annotation Effort via Max-Volume Spectral Sampling.**. *Findings of ACL (EMNLP 2021).*
- A. Quattoni, X. Carreras, **A comparison between CNNs and WFAs for Sequence Classification.**. *Workshop SustaiNLP (EMNLP 2020).*
- A. Quattoni, X. Carreras, **Interpolated Spectral NGram Language Models**. *Conference of the Association for Computational Linguistics (ACL 2018).*
- J.Eisner, M Gallé, J. Heinz, A. Quattoni, G. Rabusseau **Proceedings of the Workshop on Deep Learning and Formal Languages: Building Bridges**. *(ACL Worshops 2018).*
- A. Quattoni, X. Carreras and M. Galle, **A Maximum Matching Algorithm for Basis Selection in Spectral Learning**. *AISTATS 2017.*
- P. Madhyastha, C. Carreras and A. Quattoni, **Prepositional Phrase Attachment over Word Embedding Products**. *International Workshop on Parsing Technologies (IWPT 2017).*
- G. Ferrero, A. Primadhanty and A. Quattoni, **InToEventS: An Interactive Toolkit for Discovering and Building Event Schemas**. *European Conference on Natural Language Processing (EACL 2017).*
- B. Balle, R. Eyraud, F. Luque, A. Quattoni and S. Verwer, **Results on the Sequence Prediction Challenge (SPiCe): A competition of Learning the Next Symbol in a Sequence.**. *Proceedings of the 13th International Conference in Grammatical Inference (ICGI 2016).*
- A. Quattoni, A. Ramisa, P. Madhyastha, E. Simo-Serra and F. Moreno-Noguer, **Structured Prediction with Output Embeddings for Semantic Image Annotation**. *Conference of the North American Chapter of the Association of Computational Linguistics (NAACL 2016).*

- L. D. Ellebracht, A. Ramisa, P. Madhyastha, E. Simo-Serra, J. Cordero-Rama, F. Moreno-Noguer and A. Quattoni, **Semantic Tuples for Evaluation of Image to Sentence Generation**. *Vision and Language Workshop at NAACL (VLW-NAACL 2015).*

- P. Madhyastha, X. Carreras and A. Quattoni, **Tailoring Word Embeddings for Bilexical Predictions: An Experimental Comparison**. *International Conference on Learning Representations (ICLR 2015).*

- A. Primadhanty, X. Carreras and A. Quattoni, **Low-Rank Regularization for Sparse Conjunctive Feature Spaces: An Application to Named Entity Classification**. *Conference of the Association for Computational Linguistics (ACL 2015).*

- A. Quattoni, B. Balle, X. Carreras and A. Globerson, **Spectral Regularization for Max-Margin Sequence Tagging**. *International Conference on Machine Learning (ICML 2014).*

- P. Madhuastha, X. Carreras and A. Quattoni, **Learning Task-Specific Bilexical Embeddings**. *International Conference on Computational Linguistics (COLING 2014).*

- R.Bailly, X. Carreras and A. Quattoni, **Unsupervised Learning of Finite State Transducers.**. *Neural Information and Processing Systems (NIPS 2013).*

- R.Bailly, X. Carreras, F.M. Luque and A. Quattoni, **Unsupervised Spectral Learning of WCFG as Low-rank Matrix Completion**. *Empirical Methods in Natural Language Processing (EMNLP 2013).*

- B. Balle, X. Carreras, F. M. Luque and A. Quattoni, **Spectral Learning of Weighted Automata: A Forward-Backward Perspective**. *Machine Learning Journal: Special Issue on Grammatical Inference.*[**64 citations**]

- E. Simo-Serra, A. Quattoni, F. Moreno-Noguer, C. Torras, **A Joint Model for 2D and 3D Pose Estimation from a Single Image**. *Computer Vision and Pattern Recognition (CVPR 2013).* [**97 citations**]

- A. Recasens, A. Quattoni, **Spectral Learning of Sequence Taggers over Continuous Spaces**. *European Conference on Machine Learning (ICML 2013).*

- B. Balle, A. Quattoni, X. Carreras, **Local Loss Optimization in Operator Models: A New Insight into Spectral Learning**. *International Conference on Machine Learning (ICML 2012).* [**45 citations**]

- F. Luque, A. Quattoni, B. Balle, X. Carreras, **Spectral Learning for Non-deterministic Dependency Parsing** . In *European Conference on Computational Linguistics (EACL)*. 2012. **Best Paper Award**. [**41 citations**]

- A. Quattoni, X. Carreras, A. Torralba, **A Latent Variable Ranking Model for Content-based Retrieval**. In *European Conference on Information Retrieval (ECIR)* . 2012.

- B. Balle, A. Quattoni, X. Carreras, **A Spectral Learning Algorithm for Finite State Transducers**. In *European Conference on Machine Learning (ECML)* . 2011. [**51 citations**]

- A. Quattoni, X. Carreras, M. Collins, and T. Darrell, **An Efficient Projection for L1,Infinity Regularization** . In *International Conference on Machine Learning (ICML)*. 2009. [**184 citations**]

- A. Quattoni and A. Torralba, **Recognizing Indoor Scenes** . In *Computer Vision and Pattern Recognition (CVPR)* . 2009. [**1137 citations**]

- A. Quattoni, M. Collins, and T. Darrell, **Transfer Learning for Image Classification with Sparse Prototype Representations** . In *Computer Vision and Pattern Recognition (CVPR)*. 2008. [**232 citations**]
- A. Quattoni, M. Collins, and T. Darrell, **Learning Image Representations Using Images with Captions** . In *Computer Vision and Pattern Recognition (CVPR)*. 2007.[**96 citations**]
- A. Quattoni, S. Wang, L.P. Morency, M. Collins and T. Darrell, **Hidden-state Conditional Random Fields** . In *Transactions on Pattern Recognition and Machine Intelligence (PAMI)*. 2007.[**642 citations**]
- L.P. Morency, A. Quattoni and T. Darrell, **Latent-Dynamic Discriminative Models for Continuous Gesture Recognition** . In *Computer Vision and Pattern Recognition (CVPR)*. 2007. [**446 citations**]
- S. Wang, A. Quattoni, L.P. Morency, D. Demirdjian and T. Darrell, **Hidden Conditional Random Fields for Gesture Recognition** . In *Computer Vision and Pattern Recognition (CVPR)* . 2006.[**576 citations**]
- A. Quattoni, M. Collins and T. Darrell, **Incorporating Semantic Constraints into a Discriminative Categorization and Labeling Model** . In *Workshop on Semantic Knowledge in Vision (WSKV)*. 2005.
- A. Quattoni, M. Collins and T. Darrell, **Conditional Random Fields for Object Recognition**. In *Neural Information and Procesing Systems (NIPS)*. 2004. [**493 citations**]

Thesis

- A. Quattoni, **Transfer Learning Algorithms for Image Classification**. *Phd. Thesis, Massachussets Institute of Technology.* 2009.
- A. Quattoni, **Latent Conditional Random Fields for Object Recognition**. *Master Thesis, Massachussets Institute of Technology.* 2005.

Technical Reports

- R. Urtasun, A. Quattoni, N. Lawrence and T. Darrell, **Transferring Nonlinear Representations using Gaussian Processes with a Shared Latent Space**. *MIT Technical Report.* 2008.
- A. Quattoni, X. Carreras, M. Collins and T. Darrell, **A Projected Subgradient Method for Scalable Multi-task Learning**. *MIT Technical Report.* 2008.

Invited Talks

- Workshop on Learning and Automata, LearnAut 2022. Title: **Exploiting Hankel Matrices for Diversity Sampling.**, July 2022.
- Workshop on Deep Learning and Formal Languages: Building Bridges, ACL 2019, Title: **A Story about WFAs, RNNs and Hankel Matrices**, August 2019.
- Machine Learning Workshop on Learning with Structured Data, MLST 2015, Title: **Hankel Based Methods for Learning Non-Deterministic Automata**, December 2015.
- Portuguese Conference on Machnine Learning, EPIA 2015, Title: **Hankel Based Methods for Learning Non-Deterministic Automata**, KeyNote September 2015.

- Lisbon Machine Learning School 2014, Title: **Hankel Based Methods for Learning Non-Deterministic Automata**, July 2014.
- NIPS Spectral Learning Workshop, Title: **An Automata Theory Perspective on Spectral Learning: Hankel Matrix Factorizations**, December 2012.
- 4th UK Computer Vision Student Workshop (BMVW), Title: **Latent Variable Models for Content-Based Image Retrieval and Structure Prediction**, September 2012.
- Institut de Robòtica i Informatica Industrial, IRI Research Seminar, Title: **Spectral Methods for Sequence Prediction**, December 2011.
- Pascal Workshop on Recent Trends in Machine Learning and Data Mining, Title: **Spectral Learning Methods for Finite-State Machines with Applications to Natural Language Processing** September 2011.
- University of Berkeley, Machine Learning Seminar, Title: **An Efficient Method for Large-Scale Multi-task Learning: An Application to Image Classification**, April 2009.
- University of Illinois at Urbanan-Champaign, Computer Vision Seminar, Title: **Transfer Learning with Sparse Prototype Representations**, May 2008.

Teaching Experience

- July 2014. **Tutorial on Spectral Learning Techniques for Weighted Automata, Transducers and Grammars**, Tutorial given at the International Conference of Empirical Methods for Natural Language Processing (EMNLP 2014)
- September 2010 and September 2011. Teacher of the undergraduate course **"Programació I"**, Barcelona School of Informatics (FIB), Technical University of Catalonia (UPC).
- April 2010, March 2011, April 2012. **"Introduction to Statistical Machine Learning"**. Invited Course at "VIBOT – Erasmus Mundus Masters in VIsion & robotics", University of Girona (UdG). Joint with Xavier Carreras (UPC).

Academic Advising

- 2012-2017. Phd Advisor (jointly with Xavier Carreras) of Pranava Madhyastha. Graduated on July 2017. Thesis Title: **Exploiting Word Embeddings for Modeling Bilexical Relations**
- 2012-2017. Phd Advisor (jointly with Xavier Carreras) of Audi Primadhanty. Graduated on November 2017. Thesis Title: **Low Rank Tensor Models for Entity and Relation Extraction.**
- 2012. Undergraduate Thesis Advisor at the UPC, Rafael Jaume. Thesis Title: **Domain Adaptation for Visual Recognition.**

Professional Activities

- **Area Chair:**
  Area Chair ICML 2018.
  Area Chair (Machine Learning Track) ACL 2018.
  Area Chair NIPS 2017.
  Area Chair (Machine Learning Track) EMNLP 2016.

Organizing Committed of Sequence Prediction Challenge at ICCGI 2016.

- **Journal Reviewing:**
  IEEE Transactions on Pattern Analysis and Machine Learning (PAMI);
  International Journal of Computer Vision;
  Pattern Recognition Letters;

- **Conference Reviewing / Program Committee Member**:
  ACL, Association for Computational Linguistics;
  NIPS, Neural Information Processing Systems;
  ECML, European Conference on Machine Learning;
  CVPR, Conference on Computer Vision and Pattern Recognition;
  ECCV, European Conference on Computer Vision;
  IJCAI, International Joint Conference on Artificial Intelligence;

Software

- **HCRF: Hidden Conditional Random Fields Library.** Released under LGPL.
  http://sourceforge.net/projects/hcrf/