Xi Victoria Lin

Contact Information

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Research Interests

Natural language understanding, machine learning and knowledge representation

Education

University of Washington, Seattle, WA
Ph.D. candidate, Computer Science and Engineering, June 2013 - *present*
- Advisor(s): Prof. Luke Zettlemoyer
- Research Interest: semantic parsing, natural language understanding

University of Pennsylvania, Philadelphia, PA
Ph.D. graduated as M.Sc., Computer and Information Science, May 2013
- Cumulative GPA: 3.86/4.0
- Advisor: Prof. Benjamin Taskar
- Research Interest: natural language processing, machine learning

University of Oxford, Kellogg College, Oxford, UK
M.Sc., Computer Science (w. Distinction), September 2011
- Advisor: Prof. Stephen Pulman
- Area of Study: computational linguistics, logic and formal semantics

The Hong Kong Polytechnic University, Kowloon, HK
B.Eng., Electronic & Information Engineering, August 2010
- Cumulative GPA: 4.0/4.0
- Advisor: Prof. Kenneth K. M. Lam

Xi'an Jiaotong University, Xi'an, China
Special Class for the Gifted Young, January 2008
- University preparatory program emphasizing math and science training for 9th-grade students selected from across mainland China

Research Projects

Program Synthesis from Natural Language Using Neural Networks (2016 - *present*)
With Chenglong Wang, Kevin Vu, Deric Pang, Profs. Michael Ernst and Luke Zettlemoyer
This project sought to make programming easier and more productive by letting programmers use their own words and concepts to express their intended operations, rather than forcing them to accommodate memorized machine grammar. Our system, Tellina (http://tellina.rocks), lets programmers describe desired operations in natural language, then automatically translates it to a programming language for them to review and approve. In a controlled study, programmers who used Tellina outperformed non-users on a series of controlled programming tasks to a statistically significant degree, even when Tellina's predictions were not completely correct.

Cross-lingual Distant Supervision for Relation Extraction (2014 - *2016*)
With Sameer Singh and Prof. Luke Zettlemoyer
This project proposed bilingual projection to strengthen the distant supervision signal for relation extraction in two languages, English and Chinese. We assume that text patterns that are translations of each other should express the same set of relations. Conversely, patterns that express the same relations are likely to be translations of

each other. We observed that combining the distant supervision data of the languages alone improves predictions over both languages, and adding bilingual projection of the text patterns further improves the results.

Multi-label Learning with Posterior Regularization (2013 - 2014)
With Sameer Singh, Luheng He, Profs. Benjamin Taskar and Luke Zettlemoyer
This work uses posterior regularization techniques to enforce soft constraints on the output of discriminative classifiers, regularizing them to prefer sparse and low-rank predictions. By avoiding strict low-rank constraints we enable a learned trade-off leading to better classifier generation. Experiments in both image and text domains demonstrate the contributions of each modeling assumption and show that the approach achieve state-of-the-art performance on a number of challenging datasets.

Fine-grained Named Entity Classification in Machine Reading (2011)
With Prof. Stephen Pulman
This work addresses the problem of classifying named entities into entry-level categories, with a special focus on the *people* domain. We observed that oftentimes humans can infer an entry-level category for an entity based on the context of its first mention, and automated this task using a bootstrapping extractor which iteratively 1) mines "is-a" relations between a person and an entry-level category; 2) discovers new person entities and new categories from text. The classifier performs competitively on manually annotated sentences.

Research Internships

Microsoft Research, Redmond, WA. (Summer 2015)
Efficient Relation Extraction from Embedded Knowledge Graph and Text
With Researchers Kristina Toutanova, Wen-tau Yih, Hoifung Poon and Chris Quirk
Modeling relation paths has offered significant gains in embedding models for knowledge base (KB) completion. This project proposed the first exact dynamic programming algorithm, which enables efficient incorporation of all relation paths of bounded length while modeling both relation types and intermediate nodes in compositional path representations. We conduct a theoretical analysis of the efficiency gain from the approach. Experiments on two datasets show that it addresses representational limitations in prior approaches and improves accuracy in KB completion.

Allen Institute for Artificial Inteliigence, Seattle, WA. (Summer 2014)
Knowledge Extraction for Elementary Physics Reading Comprehension
With Researcher Tom Kwiatkowski
We formulated the elementary school physics reading comprehension problem in a knowledge extraction and inference pipeline and focused on designing a knowledge representation that supports efficient inference. This project raised two challenging open problems: 1) Can we develop a symbolic language to describe the operation and inference required to solve physics problems? 2) Can we train machines to deduce and execute highly abstract inference procedures in an end-to-end set-up?

Conference Publications

[1] Lin, X. V., Wang, C., Pang, D., Vu, K., Zettlemoyer, L., Ernst, M. Program Synthesis from Natural Language Using Recurrent Neural Networks. *In submission.*

[2] Toutanova, K., Lin, X. V., Yih, W., Poon, H., Quirk, C. Compositional Learning of Embeddings for Relation Paths in Knowledge Bases and Text. In *Proceedings of the 54th Annual Meeting of the Association for Computational Linguistics (ACL)*, August 7-12, 2016, Berlin, Germany.

Other Publications

[3] Lin, X.V., Singh, S., He, L., Taskar, B., and Zettlemoyer, L. Multi-label Learning with Posterior Regularization. In *NIPS Workshop on Modern Machine Learning and Natural Language Processing*, December 08–12, 2014, Montreal, Canada.

[4] Lin, X.V. Fine-grained Named Entity Classification in Machine Reading. *M.Sc. thesis*. Oxford University. 2011.

Teaching Experience

University of Pennsylvania, Philadelphia, PA

Teaching Assistant

- CIS520: Machine Learning Fall 2012
  - Writing exam questions; answering Piazza questions; office hours; grading

Honors and Awards

University of Pennsylvania

- Doctoral Fellowship, 2011–2013

The Hong Kong Polytechnic University

- Best Academic Performance Award, EIE Department, 2009–2010
- Hong Kong SAR Government Scholarship, 2009-2010
- Hong Kong Polytechnic University Post-entry Scholarship, 2008–2009
- Hong Kong & Kowloon Electrical Appliances Merchants Association Scholarship, 2008–2009
- Apple Inc. WWDC Student Scholarship, 2009

Conference Services

Reviewer: EMNLP 2015, 2016, 2017
Reviewer: ACL 2017
PC Member: Automated Knowledge Base Construction (AKBC) 2016

Programming Skills

Deep Learning APIs: Tensorflow, Torch7, Theano
Languages: Python, Java, Matlab, R, C++, Lua, HTML, CSS, JavaScript

References Available to Contact

Prof. Luke S. Zettlemoyer (e-mail: lsz@cs.washington.edu)

- ⋆ *Primary research adviser*
- Associate Professor , Computer Science & Engineering, University of Washington
- ◇ 185 Stevens Way, Seattle, WA 98195-2350

Prof. Michael D. Ernst (e-mail: mernst@cs.washington.edu)

- ⋆ *Secondary research adviser*
- Professor , Computer Science & Engineering, University of Washington
- ◇ 185 Stevens Way, Seattle, WA 98195-2350

Prof. Stephen Pulman (e-mail: sgp@clg.ox.ac.uk; phone: +44-186-561-0800)

- ⋆ *M.Sc. thesis advisor*
- FBA Professor, Computational Linguistics, University of Oxford
- ◇ Wolfson Building, Parks Road, Oxford OX1 3QD

Prof. Kenneth Lam (e-mail: enkmlam@polyu.edu.hk; phone: +852-2766-6207)

- ⋆ *B.Eng. thesis advisor*
- Professor, Electronic and Information Engineering, The Hong Kong Polytechnic University
- ◇ Room DE503c, EIE Department, HKPU, Hung Hom, Kowloon, Hong Kong.