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John P. Lalor

Research Interests

My research is in machine learning and natural language processing. I am particularly interested in model evaluation and quantifying uncertainty, as well as applications in biomedical informatics.

Education

Summer 2019 (expected) **Ph.D. Computer Science**, University of Massachusetts, Amherst, MA.
Advisor: Hong Yu

2015 **M.S. Computer Science**, DePaul University, Chicago, IL.
Graduated with Distinction

2011 **B.B.A. IT Management**, University of Notre Dame, South Bend, IN.
Minor: Irish Language and Literature Graduated Cum Laude

Professional Experience

2018 **Applied Scientist Intern**, Amazon Alexa, Cambridge, MA.
Supervisors: Bill Campbell and Eunah Cho

2015 - present **Research Assistant**, BioNLP Group, Amherst, MA.
Supervisor: Hong Yu

2017 **Applied Scientist Intern**, Amazon Alexa, Cambridge, MA.
Supervisors: Imre Kiss and Francois Mairesse

2016 **Intern**, ESPN Advanced Technology Group, Bristol, CT.
Supervisor: Zvi Topol

2013 - 2015 **Software Developer**, Eze Software Group, Chicago, IL.

2011 - 2013 **Advisory Sr. Associate**, KPMG, Philadelphia, PA, Chicago, IL.

Honors and Awards

2018 UMass CICS Travel Grant recipient

2015 DePaul University Graduate Assistantship

2015 Inducted into the Upsilon Pi Epsilon computer science honor society, DePaul chapter

2007 - 2011 Dean's List 4 semesters at Notre Dame

Publications

Manuscripts Under Review

18 J.P. Lalor, H. Wu, H. Yu. Learning Latent Parameters without Human Response Patterns: Item Response Theory with Artificial Crowds.

17 J.P. Lalor, H. Wu, H. Yu. Comparing Human and DNN-Ensemble Response Patterns for Item Response Theory Model Fitting.

16 E. Cho, H. Xie, J.P. Lalor, V. Kumar, W. M. Campbell. Efficient Semi-Supervised Learning for Natural Language Understanding by Optimizing Diversity.

15 J. Chen, **J.P. Lalor**, W. Liu, E. Druhl, H. Yu. Detecting Hypoglycemia Incidents Reported in Patients' Secure Messages: Using Cost-sensitive Learning and Oversampling to Reduce Data Imbalance. *JMIR Preprints.* 21/08/2018:11990 DOI: 10.2196/preprints.11990

Journal and Conference Publications

14 **J.P. Lalor**, B. Woolf, H. Yu. Improving EHR Note Comprehension with NoteAid: A Randomized Trial of EHR Note Comprehension Interventions with Crowdsourced Workers. *J Med Internet Res* 2019;21(1):e10793. doi:10.2196/10793.

13 **J.P. Lalor**, H. Wu, T. Munkhdalai, H. Yu. Understanding Deep Learning Performance through an Examination of Test Set Difficulty: A Psychometric Case Study. *EMNLP 2018: Conference on Empirical Methods in Natural Language Processing*, 2018.
Oral presentation, top 9.9% of submitted short papers

12 **J.P. Lalor**, H. Wu, L. Chen, K. Mazor, H. Yu. ComprehENotes, an Instrument for Assessing Patient Electronic Health Record Note Reading Comprehension: Development and Validation. *J Med Internet Res* 2018;20(4):e139. doi:10.2196/jmir.9380

11 T. Munkhdalai, **J.P. Lalor**, H. Yu. Citation Analysis with Neural Attention Models. *LOUHI 2016 : The Seventh International Workshop on Health Text Mining and Information Analysis*, Austin, TX, USA, November 2016.

10 **J.P. Lalor**, H. Wu, H. Yu. Building an Evaluation Scale using Item Response Theory. *EMNLP 2016: Conference on Empirical Methods in Natural Language Processing*, Austin, TX, USA, November 2016.

9 C. Miller, A. Settle, **J.P. Lalor**. Learning Object-Oriented Programming in Python: Towards an Inventory of Difficulties and Testing Pitfalls. *SIGITE 2015: The Special Interest Group for Information Technology Education Conference*, Chicago, IL, October 2015

8 A. Settle, **J.P. Lalor**, T. Steinbach. Evaluating a Linked-Courses Learning Community for Development Majors. *SIGITE 2015: The Special Interest Group for Information Technology Education Conference*, Chicago, IL, October 2015

7 A. Settle, **J.P. Lalor**, T. Steinbach. A Computer Science Linked-Courses Learning Community. *ITiCSE 2015: The 20th Annual Conference on Innovation and Technology in Computer Science Education*. Vilnius, Lithuania, July 2015

6 A. Settle, **J.P. Lalor**, T. Steinbach. Reconsidering the Impact of CS1 on Novice Attitudes. *SIGCSE 2015: The ACM Special Interest Group on Computer Science Education*. Kansas City, MO, March 2015

Workshop Papers, Posters, and Abstracts

5 J. Chen, **J.P. Lalor**, H. Yu. Detecting Hypoglycemia Incidents from Patients' Secure Messages. *American Medical Informatics Association (AMIA) Annual Symposium* Poster, 2018

4 **J.P. Lalor**, H. Wu, H. Yu. Soft Label Memorization-Generalization for Natural Language Inference. *Workshop on Uncertainty in Deep Learning. Uncertainty in Artificial Intelligence (UAI)*, 2018.

3 **J.P. Lalor**, H. Wu, H. Yu. Modeling Difficulty to Understand Deep Learning Performance. *Northern Lights Deep Learning Workshop (NLDL)*, 2018.

2 **J.P. Lalor**, H. Wu, H. Yu. CIFT: Crowd-Informed Fine-Tuning to Improve Machine Learning Ability. *Human Computation and Crowdsourcing (HCOMP)* Works-in-Progress, 2017.

1 **J.P. Lalor**, H. Wu, L. Chen, K. Mazor, H. Yu. Generating a Test of Electronic Health Record Narrative Comprehension with Item Response Theory. *American Medical Informatics Association (AMIA) Annual Symposium* Podium Abstract, 2017.

Tutorials and Invited Talks

11/2018 Evaluation and Interpretability in Deep Neural Networks. *American Medical Informatics Association (AMIA) Annual Symposium* Instructional Workshop, 2018. With A. Jagannatha and H. Yu.

10/2018 ComprehENotes: A New Test of EHR Note Comprehension. *University of Notre Dame Mendoza College of Business.*

09/2018 Leveraging Uncertainty for Better DNN Training and Evaluation. *UMass Lowell Data Science Lecture Series.*

09/2017 Building Better Evaluations using Item Response Theory. *University of Notre Dame Natural Language Processing Group.*

12/2016 Building Evaluation Scales for NLP using Item Response Theory. *UMass CICS Machine Learning and Friends Lunch series.*

Teaching and Mentoring Experience

Fall 2018 **Instructor**, UMass Lowell Data Science Lecture Series, University of Massachusetts Lowell.
Prepared and gave three lectures on evaluation and interpretability in deep neural networks

Fall 2018 **Instructor**, CICS First Year Seminar, University of Massachusetts Amherst.
Seminar for first year students on Artificial Intelligence in Healthcare. I am the sole instructor for this course, and designed the syllabus, lectures, and assignments.

2018 **Research Mentor**, Long Le, B.S. in Computer Science, University of Massachusetts Amherst.
Project: Analysis of Easy/Difficult Images for CNN Models

2018 **Research Mentor**, UMass CICS Industry Mentor Program.
Project: Analyzing Users within Organizations with NLP

2017-2018 **Research Mentor**, Nikhil Titus, M.S. in Computer Science, University of Massachusetts Amherst.
Project: Neural Question Generation

2015 **Teaching Assistant**, Introduction to Computer Science, Amherst College, Amherst, MA.
Professor: Crystal Valentine
As TA I held weekly office hours, assisted students during weekly lab session, and graded weekly lab programming asssignments. I also prepared and gave two lectures during the semester.

2014 - 2015 **Tutor**, DePaul University.
Tutor for masters and undergraduate students in Computer Science on courses involving Python, SQL, and HTML/CSS

Service

2019 **Reviewer**, NAACL.

2018 - present **Co-organizer**, UMass CICS Machine Learning and Friends Lunch..

2018 **Reviewer**, American Journal of Preventative Medicine (AJPM), American Medical Informatics Association (AMIA) Annual Symposium, Journal of Medical Internet Research (JMIR).

2017 **Reviewer**, Journal of Medical Internet Research (JMIR).

2014 - 2015 **Graduate Ambassador**, DePaul University.
Spoke with prospective graduate students about DePaul and the MS program.