

Mandy B. Korpusik

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EDUCATION

- 2019 Ph.D. in ELECTRICAL ENGINEERING AND COMPUTER SCIENCE
Massachusetts Institute of Technology, Cambridge, MA
- 2015 S.M. in ELECTRICAL ENGINEERING AND COMPUTER SCIENCE
Massachusetts Institute of Technology, Cambridge, MA
- 2013 B. S. in ELECTRICAL AND COMPUTER ENGINEERING
Franklin W. Olin College of Engineering, Needham, MA

AWARDS

- 2019 Paul L. Penfield Student Service Award, MIT EECS Department.
- 2019 Semifinalist, MIT 100K Launch.
- 2016 Service Award, Sidney Pacific Graduate Residence.
- 2015 Fellowship, National Science and Engineering Graduate (NDSEG).
- 2015 Honorable Mention, National Science Foundation (NSF) Graduate Research Fellowship.
- 2014 Best Rated Poster Presentation Award: Demos, Spoken Language Technology Workshop (SLT), South Lake Tahoe.

TEACHING EXPERIENCE

- 2014–2019 Undergraduate Research Opportunity Project Mentor, CSAIL, MIT
- 2016 CS Instructor, Women's Technology Program, MIT
- 2016 Co-Instructor, IAP Speech and Language Processing Course, MIT
- 2015 Kaufman Teaching Certificate Program, MIT
- 2012 Software Design Teaching Assistant, OLIN COLLEGE

RESEARCH INTERESTS

My primary research interest is natural language processing (NLP), especially spoken language understanding and dialogue systems. For my PhD, I designed novel convolutional neural network models that perform semantic tagging and mapping of natural language meal descriptions to semantically similar USDA food database entries. I also demonstrated that asking followup clarification questions with deep reinforcement learning boosts food recall performance by narrowing down the search space. I showed that these neural convolutional models generalize to other tasks beyond nutrition, including semantic tagging of user queries in flight and movie booking domains, as well as dialogue state tracking for restaurant booking conversations. I am interested in developing conversational agents that use recurrent neural network models to converse naturally with humans, and reinforcement learning to adapt online to users in order to personalize each interaction.

RESEARCH EXPERIENCE

- 2014–2019 | Deep Learning Models for Dialogue Systems at MIT CSAIL
In collaboration with Tufts University nutritionists and Dr. Jim Glass at MIT, built a nutrition dialogue system for iOS (see [Coco Nutritionist](#) in the Apple Store) that automatically extracts nutritional content of food in a user’s spoken meal description, using deep learning.
- 2015 | Deep Learning Internship at FXPAL
With Dr. Francine Chen, applied deep learning techniques to the problem of predicting customer behavior from Twitter data.
- 2012 | Distributed REU at COLUMBIA UNIVERSITY
With Professor Hirschberg, generated grammatically correct sentences given tweets, which were fed to WordsEye for generating 3D scenes.
- 2012 | Active Crowd Sourcing for Disaster Response at OLIN COLLEGE
With Professor Mark Chang and the MIT Lincoln Lab, used SVMs to identify tweets as calls to action for emergency situations.
- 2011 | Trustable Computing Systems REU at UNIVERSITY OF CONNECTICUT
With Professor Chandy, simulated data deduplication security for cloud storage in OMNeT++ to investigate how much extra computation is required for three levels of increasing security on cloud storage: encryption, convergent, and distributed encryption.

CONFERENCE PROCEEDINGS

- 2019 | *Dialogue State Tracking with Convolutional Semantic Taggers*. M. Korpusik, J. Glass. ICASSP, Brighton, UK.
- 2018 | *Convolutional Neural Networks for Dialogue State Tracking without Pre-trained Word Vectors or Semantic Dictionaries*. M. Korpusik, J. Glass. SLT, Athens.
- 2018 | *Convolutional Neural Networks and Multitask Strategies for Semantic Mapping of Natural Language Input to a Structured Database*. M. Korpusik, J. Glass. ICASSP, Calgary.
- 2017 | *Character-based Embedding Models and Reranking Strategies for Understanding Natural Language Meal Descriptions*. M. Korpusik, Z. Collins, J. Glass. Interspeech, Stockholm.
- 2017 | *Semantic Mapping of Natural Language Input to Database Entries via Convolutional Neural Networks*. M. Korpusik, Z. Collins, J. Glass. ICASSP, New Orleans.
- 2016 | *Distributional Semantics for Understanding Spoken Meal Descriptions*. M. Korpusik, C. Huang, M. Price, J. Glass. ICASSP, Shanghai.
- 2014 | *Data Collection and Language Understanding of Food Descriptions*. M. Korpusik, N. Schmidt, J. Drexler, S. Cyphers, J. Glass. SLT, South Lake Tahoe.

JOURNAL ARTICLES

- 2019 *Deep Learning for Database Mapping and Asking Clarification Questions in Dialogue Systems*. M. Korpusik, J. Glass. IEEE Transactions on Audio, Speech and Language Processing.
- 2017 *Spoken Language Understanding for a Nutrition Dialogue System*. M. Korpusik, J. Glass. IEEE Transactions on Audio, Speech, and Language Processing.

WORKSHOPS

- 2019 *A Food Logging System for iOS with Natural Spoken Language Meal Descriptions*. M. Korpusik, S. Taylor, S. Das, C. Gilhooly, S. Roberts, J. Glass. Nutrition 2019, Baltimore.
- 2019 *Testing the Validity of a Natural Spoken Language Application for the Self-monitoring of Daily Dietary Intake*. R. Silver, M. Korpusik, S. Taylor, S. Das, C. Gilhooly, J. Glass, S. Roberts. Nutrition 2019, Baltimore.
- 2019 *Convolutional Neural Encoder for the 7th Dialogue System Technology Challenge*. M. Korpusik, J. Glass. DSTC7 Workshop, Honolulu.
- 2016 *Recurrent Neural Networks for Customer Purchase Prediction on Twitter*. M. Korpusik, S. Sakaki, F. Chen, Y. Chen. CBRecSys, Boston.
- 2016 *Corpus for Customer Purchase Behavior Prediction in Social Media*. S. Sakaki, F. Chen, M. Korpusik, Y. Chen. LREC, Portoroz.

INVITED TALKS

- 2018 Talk, CMU, PITTSBURGH
- 2017 Panel, Young Female Researchers in Speech Workshop, KTH, SWEDEN

CAMPUS TALKS

- 2016 Pitch, Machine Intelligence Summit, PILLAR & MIT
- 2016 Talk, CSAIL Research Party, MIT
- 2016 Talk, CSAIL Advisory Board Meeting, MIT
- 2014 Talk, Women in Technology Program (WTP), MIT

PATENT APPLICATIONS

- 2018 Korpusik, M. et al. A System and Method for Semantic Mapping of Natural Language Input to Database Entries via Convolutional Neural Networks. U.S. Patent Application 15/922394. Patent Pending.
- 2015 Korpusik, M. et al. Behavior Prediction on Social Media Using Neural Networks. U.S. Patent Application 14/966438. Patent Pending.

MEDIA COVERAGE

- 2019 *Exploring the nature of intelligence*, Kim Martineau, MIT NEWS
- 2019 *Inside AI*, Rob May, INSIDEAI NEWSLETTER
- 2016 *Voice-controlled calorie counter*, Larry Hardesty, MIT NEWS

LEADERSHIP AND ACTIVITIES

- 2016–2019 Sandbox Program, MIT
- 2015–2019 Venture Mentoring Service, MIT
- 2018 Rising Stars EECS Workshop, MIT
- 2018 MIT I-Corps Program, MIT
- 2016 Co-President, Graduate Women in Electrical Engineering and Computer Science (GW6), MIT
- 2015 Inventory Chair, Sidney Pacific Graduate Residence, MIT
- 2015 Academic Chair, Graduate Student Association (GSA), MIT
- 2015 Athletics Chair, GSA, MIT
- 2014 Path of Professorship Workshop, MIT
- 2012 President, Society of Women Engineers (SWE), OLIN COLLEGE
- 2012 Resident Resource Search Committee, OLIN COLLEGE
- 2011 Vice President, SWE, OLIN COLLEGE
- 2010 Communications Chair, SWE, OLIN COLLEGE