Md Mosharaf Hossain

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Education

University of North Texas — *May 2019 - Dec 2022*
Ph.D., Computer Science and Engineering — GPA: 4.0/4.0

Tennessee Tech University — *Aug 2016 - Dec 2018*
M.Sc., Computer Science — GPA: 4.0/4.0

Coursera.org — *Aug 2017 - Apr 2018*
Deep Learning Specialization

Bangladesh University of Engineering and Technology — *Dec 2004 - Oct 2009*
B.Sc., Computer Science and Engineering

Research Interests

Natural Language Understanding and Generation, Computational Linguistics, Artificial Intelligence, Deep Learning

Publications

1. **Md Mosharaf Hossain**, Venelin Kovatchev, Pranoy Dutta, Tiffany Kao, Elizabeth Wei and Eduardo Blanco. *An Analysis of Natural Language Inference Benchmarks through the Lens of Negation.* In Proceedings of the 2020 Conference on Empirical Methods in Natural Language Processing (**EMNLP**), pp.9106–9118.
2. **Md Mosharaf Hossain**, Antonios Anastasopoulos, Eduardo Blanco and Alexis Palmer. 2020. *It's not a Non-Issue: Negation as a Source of Error in Machine Translation.* In Findings of the 2020 Conference on Empirical Methods in Natural Language Processing (**Findings of EMNLP**).
3. **Md Mosharaf Hossain**, Kathleen Hamilton, Alexis Palmer and Eduardo Blanco. 2020. *Predicting the Focus of Negation: Model and Error Analysis.* In Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics (**ACL**).
4. **Md Mosharaf Hossain**, Thomas M. Hines, Sheikh K. Ghafoor, Sheikh Rabiul Islam, Ramakrishnan Kannan, and Sreenivas R. Sukumar. *A flexible-blocking Based Approach for Performance Tuning of Matrix Multiplication Routines for Large Matrices with Edge Cases.* In 2018 IEEE International Conference on Big Data (Big Data), IEEE.
5. A. H. M. Jakaria, **Md Mosharaf Hossain**, and Mohammad Ashiqur Rahman. *Smart Weather Forecasting Using Machine Learning: A Case Study in Tennessee.* arXiv preprint arXiv:2008.10789 (2020).

Talks

1. Presented paper at the Proceedings of the 2020 Conference on Empirical Methods in Natural Language Processing (EMNLP), November 2020.
2. Presented paper at the Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics (ACL), July 2020.
3. Presented research work on *Benchmarking matrx multiplication routines in many-core environment* in March 2017 at Tennessee Tech University.

Teaching Experiences

At **Tennessee Tech University**

Fall 2016	CSC 2700 Discrete Structures for Computer Science
Spring 2017	CSC 2700 Discrete Structures for Computer Science
Fall 2018	CSC 2500 Unix Lab

Employment History

Graduate Research Assistant, CSE, UNT May 2019 - Current

- I do research in natural language processing, particularly on natural language understanding and generation. Majority of my work focuses on understanding and inference with negation in monolingual and multilingual settings. Advisor: Dr. Eduardo Blanco, Assistant Professor, UNT

Research Intern, Analytics and Machine Intelligence, Raytheon May 2020 - Aug 2020

- Explored *joint neural models* and *global features* based ideas for Information Extraction (IE).
- Explored the impact of *context* as well as capability of *active learning* techniques to solve downstream tasks of IE such as named entities recognition, events and relations extractions.

Machine Learning Research Intern, Oak Ridge National Lab May 2017 - Aug 2017

- Performed research on memory requirement analysis, hyperparameter optimization, time complexity, and usability of the popular Convolutional Neural Network architectures (e.g., GoogLeNet, ResNet).

Data Engineer, GrameenPhone Ltd. Mar 2012 - Dec 2015

- Developed advanced analytics models such as churn prediction, cross sell/up sell, customer profiling and segmentation.

Software Engineer, Samsung R&D Institute Bangladesh Nov 2010 - Feb 2012

- Developed, maintained, and implemented new features into Samsung Mobile OS

Technical Skills

Programming:	Python, C++, Java, R, Matlab, MPI, CUDA
Machine Learning	Neural Networks, SVM, PCA, BiLSTM, CNN, Transformers etc.
Pre-trained models	GloVe, ELMo, BERT, XLNet, RoBERTa, multilingual BERT
ML Tools	PyTorch, Keras, TensorFlow

Awards

1. Received Graduate Research Assistant-ship (from NSF Career Grant) in 2019
2. **Best Student Paper** award from ACM Mid-Southeast Conference in 2018
3. Student Travel Grant from 2017 ACM/IEEE Supercomputing Conference
4. **Top Talent** (Exceed Expectation and High Potential) award from Business Intelligence Department at GrameenPhone Limited in 2014.
5. **Nazimuddin Mondol Education Scholarship** from Grameen Bank, Bangladesh in 2007
6. Technical Scholarship from Bangladesh University of Engineering and Tech in 2005.

Recent Projects

Affirmative Interpretation of Negation Oct 2020 - Current

- Negation is a complex phenomenon in every human language. Negation can be expressed in affirmative terms to reveal it's semantics. In this project, we develop a question-answer driven methodology to uncover affirmative interpretation of negation.

Multilingual Negation Aug 2020 - Current

· We study negation semantics in a wide range of languages and build a system that detects negation using only a few examples from each language.

Information Extraction May 2020 - Aug 2020

· We explored joint neural models to solve the downstream tasks in Information extraction. We infused context from neighboring sentences to the network and found that it assists to solve the IE tasks.

Negation and Machine Translation Feb 2020 - May 2020

· We found that negation presents a challenge for the systems if either the source or destination language has sentences containing negation.

Negation and Natural Language Inference Oct 2019 - May 2020

· We analyzed the role of negation in Natural Language Inference (NLI) Benchmarks, then created a new benchmark containing negation. We observed that State-of-the-art transformers (BERT, RoBERTa, XLNet) struggle on pairs containing negation.

Negation Scope and Focus Detection May 2019 - Dec 2019

· We explored scope and focus of negation and proposed a focus detector that produced the best results thus far. We observed that scope and context information individually help to detect focus, however, scope information is more beneficial to the neural model.