

MUHAMMAD MAHBUBUR RAHMAN
4807 Westland Blvd., Apt. A, Halethorpe, MD 21227
443-847-4611* mahbubur84k@gmail.com

RESEARCH INTERESTS

I am interested in real world problems in the fields of Artificial intelligence, Machine Learning, Natural Language Processing, Data Science and Health Care.

EXPERIENCES

Postdoctoral Researcher (AI and Machine Learning)

October 2019 to Current

Technology and Translational Research Unit
National Institute on Drug Abuse (NIDA)
National Institutes of Health (NIH)

Responsibilities

Developing AI, Machine Learning and NLP models for healthcare outcome prediction
Designing research studies, defining and testing hypotheses
Developing field tools for data collections, cleaning and processing
Doing data analysis, writing research papers and research protocols
Maintaining application and data servers
Supervising junior fellows and interns
Collaborating with external and internal interdisciplinary teams

Postdoctoral Researcher

Oct 2018 to Sep 2019

CLSP Research Lab
Whiting School of Engineering
Johns Hopkins University

Responsibilities

Developing IR, ML and NLP models for cross-lingual information retrieval
Maintaining codebase for IR in low-resource setting
Researching and developing adversarial deep learning models for IR
Writing research papers and technical reports
Presenting research results in conferences and workshops

Teacher Assistant (TA)

August 2017 to may 2018

Department of Computer Science and Electrical Engineering
University of Maryland Baltimore County (UMBC)

Responsibilities

Developing homework and course content
Grading homework, and exam scripts
Guiding students in lab and office hour

Research Assistant

June 2014 to August 2018

eBiquity Research Lab
Department of Computer Science and Electrical Engineering
University of Maryland Baltimore County (UMBC)

Responsibilities

Working on various research projects assigned by PhD supervisor
Designing, implementing and writing dissertation
Writing research papers, presenting results in conferences and workshops
Advising and helping junior PhD students and masters students
Maintaining and scheduling weekly lab meetings

Summer Research Intern**June 2017 to August 2017**

eBay Inc.
San Jose, CA

Responsibilities

Conducting research on large scale e-commerce data
Developing deep learning models to understand deep concepts from e-commerce data

Research Associate**June 2014 to January 2017**

RedShred, LLC
BWTech @ UMBC Cyber Incubator

Responsibilities

Working on various research projects (ML/NLP) related to research grants
Writing technical reports on research projects
Contributing to company's codebase for document understanding

Summer Research Intern**June 2016 to August 2016**

eBay Inc.
San Jose, CA

Responsibilities

Contributing research on eBay ShopBot (Personal shopping assistant)
Writing code for implementing entity recognition
Presenting results in group meeting regularly

Summer Research Intern**June 2015 to August 2015**

AT&T Labs- Research
Bedminster, NJ

Responsibilities

Developing methods for data anonymization
Presenting results to the team

Graduate Assistant**February 2014 to May 2014**

Department of Computer Science and Electrical Engineering
University of Maryland Baltimore County (UMBC)

Responsibilities

Grading homework and exam scripts
Advising students to understand the subject matters

Assistant Professor**January 2009 to August 2013**

Department of Computer Science
American International University-Bangladesh
Dhaka, Bangladesh

Responsibilities

Teaching core and advanced computer science courses at undergraduate and graduate level
Developing course curriculum
Supervising and mentoring students
Coordinating departmental meetings and activities

Data Analyst**June 2008 to December 2008**

Micro parts USA incorporation
Dhaka, Bangladesh

Responsibilities

Generating reports from e-commerce data and transactions
Analyzing data for decision making

RESEARCH AND DEVELOPMENT ACTIVITIES AT NIH**Research Study****Mindfulness study**

Tech leading “*Measuring the effect of a mindfulness intervention on social support during COVID-19*”

Developing computer tools to run the study

Maintaining servers (Aware, amazon cloud, database)

Covid-19 study

Member of the technical team for “*Measuring the effect of COVID-19 on people with substance use disorders*”

Developing field tools for the Covid-19 study

Data management & Analysis

Cleaning and analyzing Reddit substance use dataset

Cleaning, managing and analyzing Bluelight and Twitter datasets

Cleaning, managing and analyzing Covid and substance use dataset

Analyzing association among screen time/app usages, mood and substance use among adults

Research & Innovation**Drug language detection**

Developing Deep learning based drug language detection tool

Cleaning, managing and annotating social media data for drug terms/slang

Predicting and analyzing drug terms/slang with confidence scores

AI-powered conversational agent

Prototyping AI-powered clinical conversational agent as a real-time intervention for patient care

Developing Q/A dataset (with intent label) from public sources for conversational agent

Developing Q/A dataset (with intent label) from NIDA chat day

Building ruled based conversational agent using Bluelight data

Other research & development

Reinforcement learning based interventions for substance use and contingency management

Analyzing familial substance use history in adolescent brain using ABCD study

Prototyping of data harmonization tool in addiction, mental health and harm reduction

Predicting mood and drug craving using EMA and weather data to improve patient care

SUPERVISION and COLLABORATION at NIH

- Supervising multiple postbaccalaureate fellows and interns at NIH
- Collaborating with interdisciplinary PIs, staff scientists and postdoctoral fellows at NIDA IRP
- Collaborating with external researcher groups at University of Pennsylvania, University of Maryland, Baltimore County and Griffith University
- Member on NIH Text Mining and Natural Language Processing (NLP) Scientific Interest Group

EDUCATION**University of Maryland, Baltimore County**

Ph.D. in Computer Science

Duration: August 2013 to August 2018

Advisor: Professor Tim Finin

Graduation Date: August 2018

University of Dhaka

Master in Information Technology

Duration: July 2007 to June 2008

American International University- Bangladesh

Bachelor of Science in Computer Science

Honors: Graduated with Summa Cum Laude

Duration: May 2002 to February 2006

CERTIFICATION OR PROFESSIONAL TRAINING

- Cisco Certified IT Essential Instructor
- Oracle Database Developer

May 2009

December 2008

CHALLENGE AWARDS AND GRANTS

- ISWC Travel grant 2018
- Dissertation Fellowship 2018
- NSF travel grant, December 2017
- UMBC GSA travel grant, November 2017
- NSF travel grant, April 2017
- UMBC GSA travel grant, March 2017
- Runner-up in eBay Hackathon 2016
- Schema-agnostic Queries Semantic Web Challenge award in 12th ESWC 2015

JOURNAL AND CONFERENCE PUBLICATIONS

1. Amy E. Kwarteng, **Muhammad Mahbubur Rahman**, Dylan G. Gee, M. Alejandra Infante, Susan F. Tapert, Brenda L. Curtis, “Child Reward Neurocircuitry and Parental Substance Use History: Findings from the Adolescent Brain Cognitive Development Study” Addictive Behaviors, June, 2021
2. McKenzie Himelein-Wachowiak, Salvatore Giorgi, Amanda Devoto, **Muhammad Mahbubur Rahman**, Lyle Ungar, H. Andrew Schwartz, David H. Epstein, Lorenzo Leggio, and Brenda Curtis, Bots and Misinformation Spread on Social Media: Implications for COVID-19. Journal of Medical Internet Research, 23(5), 2021
3. Mahsa Yarmohammadi, Xutai Ma, Sorami Hisamoto, **Muhammad Mahbubur Rahman**, Yiming Wang, Hainan Xu, Daniel Povey, Philipp Koehn and Kevin Duh, “Robust Document Representations for Cross-Lingual Information Retrieval in Low-Resource Settings”, MT Summit, Dublin, Ireland, August 19-23, 2019
4. **Muhammad Mahbubur Rahman**, Tim Finin, “Unfolding the Structure of a Document using Deep Learning”, arXiv:1910.03678 [cs.CL] September 2019
5. **Muhammad Mahbubur Rahman**, Sorami Hisamoto and Kevin Duh, “Query Expansion for Cross-Language Question Re-Ranking”, arXiv:1904.07982 [cs.IR] April 2019
6. **Muhammad Mahbubur Rahman**, Tim Finin, “Understanding and representing the semantics of large structured documents”, SemDeep at 17th International Semantic Web Conference (ISWC), Monterey, CA, USA, October 8-12, 2018
7. **Muhammad Mahbubur Rahman**, Tim Finin, “Deep Understanding of a Document's Structure”, 4th IEEE/ACM International Conference on Big Data Computing, Applications and Technologies (BDCAT 2017), Austin, TX, USA, Dec 5-8, 2017
8. Zareen Syed, Lushan Han, **Muhammad Mahbubur Rahman**, Tim Finin, James Kukla and Jeehye Yun, “Querying Large Linked Data Resources”, 14th International Semantic Web Conference (ISWC) October 11-15, 2015
9. Zareen Syed, Lushan Han, **Muhammad Mahbubur Rahman**, Tim Finin, James Kukla, Jeehye Yun, “UMBC_Ebiquity-SFQ: Schema Free Querying System”, 12th Extended Semantic Web Conference (ESWC) June 1, 2015
10. Zareen Syed, Tim Finin, **Muhammad Mahbubur Rahman**, James Kukla, Jeehye Yun, “Discovering and Querying Hybrid Linked Data”, 4th ESWC Workshop on Knowledge Discovery and Data Mining Meets Linked Open Data, May 31, 2015
11. **Muhammad Mahbubur Rahman**, “Mining Social Data to Extract Intellectual Knowledge”, International Journal of Intelligent Systems and Applications (IJISA), Vol. 4, No. 10, PP.15-24, September 2012
12. **Muhammad Mahbubur Rahman**, “Intellectual Knowledge Extraction from Online Social Data”, IEEE International Conference on Informatics, Electronics & Vision (ICIEV), May 18-19, 2012, Dhaka, Bangladesh
13. Md. Saiful Islam, **Muhammad Mahbubur Rahman**, Zerina Begum and M. Z. Hafiz, “Fault Tolerant Variable Block Carry Skip Logic (VBCSL) using Parity Preserving Reversible Gates”, International Journal of Computer and Electrical Engineering, Vol.3, No.1, pp.1-7, February, 2011

14. **Muhammad Mahbubur Rahman**, Arif Ul Alam, Abdullah-Al-Mamun and Tamnun E Mursalin, “A more appropriate protein classification using data mining”, Journal of Theoretical and Applied Information Technology (JATIT), Vol. 19, No. 1, pp. 33-43, September 2010
15. Md. Saiful Islam, **Muhammad Mahbubur Rahman**, Zerina Begum and Mohd. Zulfiquar Hafiz, "Realization of a Novel Fault Tolerant Reversible Full Adder Circuit in Nanotechnology", International Arab Journal of Information Technology, Vol. 7, No. 3, pp.317-323, July 2010
16. Md. Saiful Islam, **Muhammad Mahbubur Rahman**, Zerina Begum and Mohd. Zulfiquar Hafiz, "Low-Cost Quantum Realization of Reversible Multiplier Circuit", Information Technology Journal, Vol. 8, No. 2, pp. 208-213, 2009
17. Md. Saiful Islam, **Muhammad Mahbubur Rahman**, Zerina Begum, Mohd. Zulfiquar Hafiz and A. A. Mahmud, “Synthesis of Fault Tolerant Reversible Logic Circuits”, IEEE International Conference on Testing and Diagnosis, 28-29 April, 2009, Chengdu, China
18. Md. Saiful Islam, **Muhammad Mahbubur Rahman**, Zerina Begum and M. Z. Hafiz, “Fault Tolerant Reversible Logic Synthesis: Carry Look-Ahead and Carry-Skip Adders”, IEEE International Conference on Advances in Computational Tools for Engineering Applications, pp. 396-401, 2009
19. Md. Saiful Islam, **Muhammad Mahbubur Rahman**, Zerina Begum and M. Z. Hafiz, “Efficient Approaches for Designing Fault Tolerant Reversible Carry Look-Ahead and Carry-Skip Adders”, MASAUM Journal of Basic and Applied Sciences (MJBAS), 2009
20. **Muhammad Mahbubur Rahman**, Afroza Nahar, “Modified Bully Algorithm using election commission”, MASAUM Journal of computing ISSN 2076-0833 (MJC), Vol. 1, No. 3, pp.439-446, October 2009

JOURNAL AND CONFERENCE PUBLICATIONS (IN PROCESS)

1. Salvatore Giorgi, Sharath Chandra Guntuku, McKenzie Himelein-Wachowiak, Amy Kwarteng, Sy Hwang, **Muhammad Mahbubur Rahman** and Brenda Curtis, “Twitter Corpus of the #BlackLivesMatter Movement And Counter Protests: 2013 to 2020” (**under review Nature Scientific Data**)
2. **Muhammad Mahbubur Rahman**, Amanda Devoto, Salvatore Giorgi, Lyle Ungar, Brenda Curtis, "Reinforcement Learning for Substance Use Treatment" (**to be submitted**)
3. **Muhammad Mahbubur Rahman**, Sophia Lou, Zachary Demko, Salvatore Giorgi, Lyle Ungar, Brenda Curtis, "Association between app use, mood and substance use" (**to be submitted**)

PEER REVIEWED RESEARCH POSTER PRESENTATIONS

1. Amy E. Kwarteng, **Muhammad M. Rahman**, Dylan G. Gee, M. Alejandra Infante, Susan F. Tapert, McKenzie L. Himelein-Wachowiak, Chase W. Smitterberg, Brenda L. Curtis “The Impact of Familial Substance Use History on Reward Processing in the Adolescent Brain”, APA annual meeting, Philadelphia, PA, USA, April 25-29, 2020
2. **Muhammad Mahbubur Rahman**, Tim Finin “Understanding the Logical and Semantic Structure of Large Documents”, Doctoral Forum, 2017 SIAM International Conference on Data Mining (SDM), Houston, TX, USA, April 27-29, 2017
3. **Muhammad Mahbubur Rahman**, Tim Finin, James Kukla and Jeehye Yun, “Semantic Section Identification from Vertical Domains”, 38th Annual Graduate Research Conference (GRC), UMBC, Baltimore, USA, March 23, 2016
4. **Muhammad Mahbubur Rahman**, Jim Rowland, “Contextual Unstructured Data Anonymization”, AT & T Labs- Research Summer Poster Session, June 2015
5. **Muhammad Mahbubur Rahman**, Zareen Syed, Tim Finin, James Kukla and Jeehye Yun, “Semantic Information Extraction from RFP Documents”, 37th Annual Graduate Research Conference (GRC), UMBC, Baltimore, USA, March 25, 2015
6. **Muhammad Mahbubur Rahman**, “Open Information Extraction and Topic Modeling on Academic Profiles”, 37th Annual Graduate Research Conference (GRC), UMBC, Baltimore, USA, March 25, 2015
7. **Muhammad Mahbubur Rahman**, Zareen Syed, Tim Finin, James Kukla and Jeehye Yun, “Extracting Information from RFPs”, IBM Beyond Watson conference, UMBC, Feb 23-24, 2015
8. **Muhammad Mahbubur Rahman**, Tim Finin, “A study on Facebook: spam apps and privacy”, 36th Annual Graduate Research Conference (GRC), UMBC, Baltimore, USA, March 26, 2014

9. **Muhammad Mahbubur Rahman**, Tamnun E Mursalin, Anwarul Kabir, “Automation system of Protein Databank (PDB) with new classification using clustering”, Conference Poster on Systems Biology and Computational Proteomics, USA, Dec 2-3, 2006

BOOK PUBLICATION

Muhammad Mahbubur Rahman, “Protein Classification using Machine Learning Approaches”, ISBN-10: 3659108391, ISBN-13:978-3659108396, Publisher: LAP LAMBERT Academic Publishing (April27, 2012)

OTHER RESEARCH ACTIVITIES

- Cross-Lingual IR in Machine Translation for English Retrieval of Information in any language
- Developing robust Adversarial Information Retrieval techniques to improve search quality
- Deep Concept Learning from e-commerce items using bidirectional LSTM and CNN
- Named Entity Recognition from item specifications using LSTM-CRF
- Contextual Unstructured Data Anonymization using OpenFST and CRFSuite
- Developed KB using Open Information Extraction and Topic Modeling on Academic Profiles
- Developed Prototypes and Machine Learning algorithms for open Information Extraction
- Defined NLP pipelines to successfully evaluate an RFP (Request for Proposal)
- Developed an application for Semantic Similarity measurement of natural language using Stanford Core NLP, REVERB, UMBC SemSim service, Apache Tika and Apache UIMA
- Developed a gesture-based application using smart phone to control home system
- Generation of Biologically Meaningful Non-Interacting Protein Pairs
- Statistical (using TF, TFIDF & Dynamic Programming) and Binary classifiers for gene sequences
- Stress and Non-stress Gene Sequence classification using SVM
- EEG signal classification using TF, TF-IDF, PCA, Neural Network and K-NN classifier

SELECTED PROJECTS

Slot Discovery and Linking

- Developed algorithm for discovering slot and fillers from RFP documents
- Used Microsoft Cognitive Services and Wikipedia Miner
- Used DBpedia Knowledge graph

Gesture Based Home Controlling System

- Designed and developed an Android App for writing on the Air
- Developed program to communicate with Microsoft HomeOS from Smart Phone
- Developed application to control Home devices using Lab of Things (LoT)

Cross-Lingual Information Retrieval in Low Resource Language

- Developed robust document representation system for cross-lingual setting
- Designed and implemented query expansion techniques with deep learning and DBpedia
- Worked with minimal training data for robust modeling in low resource language

Schema-agnostic query systems

- Developed NLP engine to understand natural language questions
- Designed component to generate unistructural natural answers
- Implemented Concept level Association Knowledge (CAK) to convert query into graph

SERVICES AND ACTIVITIES

- Program Committee Member / Reviewer: Journal of Social Network Analysis and Mining (SNAM), Springer Publication, AAAI, ACL, NAACL, EMNLP, AACL-IJCNLP, RepL4NLP, ADMA and Advances in Science, Technology and Engineering Systems Journal (ASTESJ)
- Senator at Graduate Student Association at University of Maryland Baltimore County
- Member of Session Planning and Management subcommittee of IEEE International Conference on Computer and Information Technology (ICCIT) 2011, Dhaka, Bangladesh

COMPUTER SKILLS

Programming: Python, Java, C/C++ and PHP

Software and ML Package: Scikit-learn, TensorFlow, Keras, SQL, Weka, MATLAB and R

Operating System: OS X, Linux and Windows

AWARDS OF EXCELLENCE

- **100% Merit** Scholarship in the university based on CGPA
- **Board** Scholarship Based on level 10th
- **Govt. Junior** Talent-pool Scholarship in eight standards
- **District Commissioner** Scholarships in six and seven standards
- **Municipality Education** Scholarship in seven Standard

EXTRA-CURRICULAR AND SOCIAL ACTIVITIES

- **Scouting:** Attended in several national, regional and local conferences, hiking to long distances.
- **Eye Camping:** Attended in several eye camping programs.
- **Essay Competitions:** Participated in many essay competitions and received several prizes.
- **Debating:** Participated in many debating contests and received several prizes.