



# Akhter Al Amin

Ph.D. Candidate

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## EDUCATION

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### Ph.D. in Computing & Information Sciences

Rochester Institute of Technology(RIT)  
Advisor: Matt Huenerfauth

CGPA: 3.97/4.00

August 2019 – May 2023 (expected)

*Courses:* Research Methods in HCI, Quantitative Methods, Qualitative Research Methods, Human-Behavior Understanding, Statistical Machine Learning, Foundations of Software Engineering, Natural Language Processing

### B.Sc. in Computer Science and Engineering

Bangladesh University of Engineering and Technology(BUET)

May 2010 – August 2015

*Courses:* Structured Programming Language, Discrete Mathematics, Object-Oriented Programming Language (C++, Java), Data Structures and Algorithms I, Data Structures and Algorithms II, Theory of Computation, Database, Computer Architecture, Software Engineering, Compiler, Data Communication, Operating System, Artificial Intelligence, Computer Networks, Computer Security, Computer Graphics

## RESEARCH EXPERIENCE

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### Graduate Research Assistant

August 2019 – Present

*Center for Accessibility and Inclusion Research Lab (CAIR), Rochester Institute of Technology Rochester, NY*

- Investigating Deaf and Hard of Hearing users' perspective regarding caption technology and usability
- Investigating how existing caption evaluation metrics can be improved to qualify users' judgment of a caption quality.
- Investigating DHH viewers' natural video watching experience using eye-tracking device.

### Undergraduate Research Assistant

Jun 2013 – Aug 2015

*Next-generation Computing (NeC) group, BUET*

*Dhaka, Bangladesh*

- My research was focused on incorporating quantum networks in solving real-life problems. While our infrastructure was not sufficient enough to implement the proposed solution, we employed theoretical methods for the implication of this network.

## RESEARCH SKILLS

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**Methods:** Eyetracker-based Behavioral Observation Study, Experimental Studies, User Interviews, User-Centered Design, Usability Evaluation, Accessibility-first Design, Prototyping, Affinity Mapping, Contextual Inquiry, User-Centered Design, Survey Design, A/B Testing, Statistical Analysis, Machine Learning

**Tools:** SurveyMonkey, Qualtrics, FFMPEG, Jirra

## PROJECTS

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### Twenty-First Century Captioning Technology Metrics and Usability.

August 2019 – Present

This project examines access to video (broadcast or streaming) and its effects on societal participation (e.g., entertainment, news, political process, etc.), and develops a modern evidence-based approach to address the caption quality and caption user interface/user experience needs of viewers who are Deaf or hard of hearing (DHH). Until now, data has been collected from 250 participants employing several data collection methods, e.g. semi-structured and structured interviews, surveys, focus-groups.

A data-informed novel machine learning-based caption evaluation model has been developed that outperformed prior state-of-the-art caption evaluation metric.

### DHH Viewers' Captioned Video Watching Behavior.

Jan 2022 – Present

To conduct a behavioral analysis on DHH viewers' gaze behavior, this project aim to collect DHH viewer in-depth data by displaying them a dataset of captioned video stimuli. An eyetracking device is currently used to track users' visual attention, scanpath, fixation, saccade length and pupil dilation. A following observational

analysis will reveal how these behavior can inform existing caption metric to predict the quality of captioning in a more effective way.

**Word Importance Analysis in Conversational Caption Transcripts.** May 2021 – Present

Deaf and Hard of Hearing (DHH) viewers tend read keywords to perceive the content of caption transcription. To predict the importance of words in caption transcription from DHH viewers' perspective, a BERT-generated embedding revealed significantly better correlation containing the importance of words than other semantic score generation system. Employing the BERT generated embedding as feature matrix, among several supervised machine learning approach, Logistic Regression model revealed higher accuracy and precision in predicting importance of words in a transcripts.

**Preferred Current Speaker Identification Methods in Captioning.** February 2021 – Present

Presence of multiple speakers on the screen make it challenging for DHH viewers to identify who is currently speaking. This research aim to understand their preferred speaker identification types and to develop a recommendation system that can suggest speaker identification types counting the number of speakers on a video frame. A total of 600 data points have been collected to build this recommendation pipeline.

**Methods for Large Vocabulary Sign Recognition and Search.** February 2020 – Present

This research evaluate how filtering with meta-data will improve American Sign Language(ASL) dictionary users' experience of conducting search in a real-time environment. The objective of this research is to propose a framework that will provide a research-based design guideline for ASL dictionary researchers to develop a user-friendly, video-based sign-lookup interface.

**Usage of Reading Assistance Tools Among DHH Professionals.** January 2021 – Present

This research investigates how DHH professionals adapt with various text simplification tool and what are the factors that influence their usage of such tool in workplace environment.

## SELECTED PUBLICATIONS

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1. [2022][Conference] **Akhter Al Amin**, Saad Hassan, Sooyeon Lee, Matt Huenerfauth. 2022. Watch It, Don't Imagine It: Creating a Better Caption-Occlusion Metric by Collecting More Ecologically Valid Judgments from DHH Viewers. In Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems. , Association for Computing Machinery, New York, NY, USA (To appear)
2. [2022][Conference] Saad Hassan\*, **Akhter Al Amin\***, Sooyeon Lee, Matt Huenerfauth. 2022. Design and Evaluation of Hybrid Search for American Sign Language to English Dictionaries: Making the Most of Imperfect Sign Recognition. In Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems. , Association for Computing Machinery, New York, NY, USA (To appear)
3. [2022][Journal] Oliver Alonzo, Lisa Elliot, Becca Dingman, Sooyeon Lee, **Akhter Al Amin**, and Matt Huenerfauth. 2022. Reading-Assistance Tools Among Deaf and Hard-of-Hearing Computing Professionals in the U.S.: Their Reading Experiences, Interests and Perceptions of Social Accessibility. In Journal of the ACM Transactions on Accessible Computing (TACCESS)., Association for Computing Machinery, New York, NY, USA (To appear)
4. [2022][Workshop] **Akhter Al Amin**, Saad Hassan, Cecilia Alm and Matt Huenerfauth. 2022. Using BERT Embeddings to Model Word Importance in Conversational Transcripts for Deaf and Hard of Hearing Users. In Proceedings of the Second Workshop on Language Technology for Equality, Diversity, Inclusion. 2022. Association for Computational Linguistics (ACL). (To appear)
5. [2022][Book Chapter] **Akhter Al Amin**, Joseph Mendis, Raja Kushalnagar, Christian Vogler, Sooyeon Lee, Matt Huenerfauth. 2022. In Proceedings of the 24th International Conference on Human-Computer Interaction (HCI). , Universal Access in Human-Computer Interaction. HCI 2022. Lecture Notes in Computer Science. Springer, Cham. (To appear)
6. [2021][Conference] **Akhter Al Amin**, Saad Hassan, and Matt Huenerfauth. 2021. Caption-occlusion severity judgments across live-television genres from deaf and hard-of-hearing viewers. In Proceedings of the 18th International Web for All Conference (W4A '21). Association for Computing Machinery, New York, NY, USA, Article 26, 1–12. DOI:<https://doi.org/10.1145/3430263.3452429>

7. [2021][Book Chapter] **Akhter Al Amin**, S. Hassan, M. Huenerfauth. 2021. Effect of Occlusion on Deaf and Hard of Hearing Users' Perception of Captioned Video Quality. In *Proceedings of the 23rd International Conference on Human-Computer Interaction (HCII)*. Universal Access in Human-Computer Interaction. HCII 2021. Lecture Notes in Computer Science. Springer, Cham. DOI: [https://doi.org/10.1007/978-3-030-78095-1\\_16](https://doi.org/10.1007/978-3-030-78095-1_16)
8. [2021][Book Chapter] **Akhter Al Amin**, A. Glasser, R. Kushalnagar, C. Vogler, M. Huenerfauth. 2021. Preferences of Deaf or Hard of Hearing Users for Live-TV Caption Appearance. In *Proceedings of the 23rd International Conference on Human-Computer Interaction (HCII)*. Universal Access in Human-Computer Interaction. HCII 2021. Lecture Notes in Computer Science. Springer, Cham. DOI: [https://doi.org/10.1007/978-3-030-78095-1\\_15](https://doi.org/10.1007/978-3-030-78095-1_15)
9. [2021] [Poster] **Akhter Al Amin**, M. Huenerfauth. 2021. Perspectives of Deaf and Hard-of-Hearing Viewers on Live-TV Caption Quality. URI: <http://hdl.handle.net/2142/109692>. *iSchool Conference (iConference'21)*. Poster Session, March 2021
10. [2015] [Conference] **Akhter Al Amin**, Akhter Al Amin, Mahmudul Hasan, Kazi Sinthia Kabir, Tanzila Choudhury, A. B. M. Alim Al Islam. 2015. Early detection of earthquake using satellite based quantum computing. 4th International Conference on Computer Science and Network Technology (ICCSNT), 2015, pp. 1079-1082, doi:<https://doi.org/10.1109/ICCSNT.2015.7490923>
11. [2014] [Poster] **Akhter Al Amin**, Asiful Haque. 2014. Clean your city efficiently with limited resource you have. URI: <https://cse.buet.ac.bd/poster/>. Thesis Poster Presentation session organised by the department of CSE, Bangladesh University of Engineering and Technology. March 2015  
[More] [Google Scholar](#).

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## TECHNICAL SKILLS

**Languages:** Python, C, MATLAB, C++, Java, Javascript  
**Script:** HTML, CSS, SASS, FFMPEG  
**Prototype:** Figma, Proto.io, Lucidchart, ShotCut(Video Editing Tool)  
**Machine Learning Tool:** Tensorflow 2.0, Keras, BERT, Numpy, Matplotlib, Jupyter Notebook, Google Colab  
**Statistics Tools:** R, Python

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## INVITED TALKS

**Methods for Conducting Semi-Structured Interview through Video-Conferencing Software** HCIN-600  
 \* I was invited by Dr. Roshan Peirish(Assistant Professor at School of Information at Rochester Institute of Technology) to give a lecture at Golisano College of Computing and Information Sciences at Rochester Institute of Technology.

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## CERTIFICATIONS

**Social and Behavioral Responsible Conduct of Research** CITI Program, A Division of BRANY  
 \* Professionalism of investigators, staff, and students conducting research in the United States and internationally, Ethical research at organizations through the education of research administrators and organizational leadership.  
**Natural Language Processing with Classification and Vector Spaces** Coursera  
 \* Machine Translation, Word Embeddings, Locality-Sensitive Hashing, Sentiment Analysis, Vector Space Models  
**Natural Language Processing with Probabilistic Models** Coursera  
 \* Word2vec, Parts-of-Speech, Tagging, N-gram, Language Models, Autocorrect

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## AWARDS & GRANTS

**Special Recognitions for Outstanding Review at CSCW 2022**  
**Best Poster Nominee.** iSchool Conference 2021  
**PhD Merit Scholarship** Full tuition and stipend support, Rochester Institute of Technology  
**Secured 7th Position.** International Robotics Competition organized by IEEE Branch IIT, Mumbai, India 2014  
**2nd Runner-up.** Regional International Robotics Competition organized by IEEE 2014  
**Best Poster.** Undergraduate Poster Competition organized by Bangladesh University of Engineering and Technology 2014  
**1st Runner-Up.** Inter-University Project Show Competition organized by Bangladesh University of Engineering and Technology, Bangladesh 2013

**1st Runner-Up.** Inter-University Project Show Competition organized by University of Dhaka, Bangladesh 2013

**Finalist.** National Hackathon organized by World Bank Group, Bangladesh 2012

**Champion.** Divisional Math Olympiad organized by Bangladesh Math Olympiad Committee 2007, 2009

## PROFESSIONAL SERVICE

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- \* Reviewer at Late-Breaking Work at Conference on Human Factors in Computing Systems (CHI) 2022.
- \* Reviewer at ACM conference on Interactive Media Experiences (IMX) 2022.
- \* Reviewer at The 25th ACM Conference On Computer-Supported Cooperative Work And Social Computing 2022.
- \* Reviewer at The ACM SIGCHI Conference on Designing Interactive Systems 2022.
- \* Reviewer at Late-Breaking Work at Conference on Human Factors in Computing Systems (CHI) 2021.
- \* Reviewer at International Conference on Automotive User Interfaces and Interactive Vehicular Applications (AutomotiveUI) 2021.
- \* Judge at Inter-University Robotics Contest organized by BUET 2014.

## PROFESSIONAL EXPERIENCE

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### Software Engineer

Oct 2016 – Jul 2019

*iPay Systems Limited.*

*iPay, Dhaka, Bangladesh*

My primary responsibility was to develop front-end applications and implementing the design provided by UX designer at the application end. Furthermore, I was responsible for developing several in-house products ensuring smooth user experience.

List of Applications:

- An Electronic-Know Your Customer (e-KYC) system for in-house employees to evaluate customer interaction with the product. The front-end application was developed using Angular JS v5.
- A customized Customer Relation Management (CRM) system for Customer-Care department. I developed this application using ReactJS.
- A Financial Reporting Solution for electronic payment Finance department. This application was developed in ReactJS.

### Software Engineering Intern

Jun 2014 – Aug 2014

*Samsung Research Bangladesh.*

*Dhaka, Bangladesh*

My primary responsibility was to develop a front-end application that will track employee activity and generate a quarterly report based on the work reported by each team. As a part of this software, a reporting module was developed to enhance stakeholders ability to monitor the employee task holistically.