# S M Mehedi Zaman

✉ sm.mehedi.zaman@rutgers.edu    |    ⌂ mehedizamane.github.io    |    ◉ github.com/mehedizamane    |    ▦ linkedin.com/in/mehedizamane    |    🎓 S M Mehedi Zaman

## Personal Profile

A first year PhD student from the iSchool at Rutgers - New Brunswick. Passionate about Computational Social Science as an Information Science major. Eager to collaborate with projects that integrate large language models, generative AI, machine learning, and their practical applications.

## Education

**Rutgers, The State University of New Jersey**                                          *New Brunswick, NJ, USA*

PhD in Communication, Information & Media                                          *Sep 2024 - May 2029 (expected)*

- Concentration: Library & Information Science
- **Advisor:** Dr. Kiran Garimella

**Islamic University of Technology**                                                            *Gazipur, BD*

BSc in Electrical and Electronic Engineering                                                *Jan 2019 - May 2023*

- CGPA: 3.54 (Out of 4.00)

## Peer-Reviewed Publications

### Conference Proceedings

Counter Turing Test (CT2): AI-Generated Text Detection is Not as Easy as You May Think - Introducing AI Detectability Index (ADI)
  Megha Chakraborty, S.M Towhidul Islam Tonmoy, **Zaman, S M Mehedi**, Shreya Gautam, Tanay Kumar, Krish Sharma, Niyar Barman, Chandan Gupta, Vinija Jain, Aman Chadha, Amit Sheth, Amitava Das
  *Proceedings of the 2023 Conference on Empirical Methods in Natural Language Processing*, 2023, Singapore

Atmospheric Influence on the Path Loss at High Frequencies for Deployment of 5G Cellular Communication Networks
  Rashed Hasan Ratul, **Mehedi Zaman, S M**, Hasib Arman Chowdhury, Md. Zayed Hassan Sagor, Mohammad Tawhid Kawser, Mirza Muntasir Nishat
  *2023 14th International Conference on Computing Communication and Networking Technologies (ICCCNT)*, 2023

OOG- Optuna Optimized GAN Sampling Technique for Tabular Imbalanced Malware Data
  S. M Towhidul Islam Tonmoy, **S M Mehedi Zaman**
  *2022 IEEE International Conference on Big Data (Big Data)*, 2022

Survival Prediction of Heart Failure Patients using Stacked Ensemble Machine Learning Algorithm
  **S M Mehedi Zaman**, Wasay Mahmood Qureshi, Md. Mohsin Sarker Raihan, Abdullah Bin Shams, Sharmin Sultana
  *2021 IEEE International Women in Engineering (WIE) Conference on Electrical and Computer Engineering (WIECON-ECE)*, 2021

## Papers Under Review

### Preprints

The What, Why, and How of Context Length Extension Techniques in Large Language Models–A Detailed Survey
  Saurav Pawar, SM Tonmoy, **Zaman, SM**, Vinija Jain, Aman Chadha, Amitava Das
  *arXiv preprint arXiv:2401.07872* (2024). 2024

" Sorry, Come Again?" Prompting–Enhancing Comprehension and Diminishing Hallucination with [PAUSE]-injected Optimal Paraphrasing
  Vipula Rawte, SM Tonmoy, **Zaman, SM**, Prachi Priya, Aman Chadha, Amit P Sheth, Amitava Das
  *arXiv preprint arXiv:2403.18976* (2024). 2024

A comprehensive survey of hallucination mitigation techniques in large language models
  SM Tonmoy, **Zaman, SM**, Vinija Jain, Anku Rani, Vipula Rawte, Aman Chadha, Amitava Das
  *arXiv preprint arXiv:2401.01313* (2024). 2024

Exploring the relationship between llm hallucinations and prompt linguistic nuances: Readability, formality, and concreteness
  Vipula Rawte, Prachi Priya, SM Tonmoy, **Zaman, SM**, Amit Sheth, Amitava Das
  *arXiv preprint arXiv:2309.11064* (2023). 2023

## Research Experience

**The Artificial Intelligence Institute of University of South Carolina (AIISC)**                    *Remote*

Research Intern                                                                                       *Feb 2023 - May 2024*

- Collaboration with a team of ten members to work towards the goal of improving generative AI and mitigating hallucination.
- Scrapped about 400k news tweet data from NY Times and compared those by generating AI text based on several LLMs.
- Among the LLMs used, Vicuna, BLOOM and OPT rendered the best outputs in terms of human like texts.
- **Supervisor:** Dr. Amitava Das

### Machine Learning Approach to Detect Schizophrenia from EEG Signal
*IUT, BD*

Undergraduate Thesis
*Aug 2022 - May 2023*

- Merged the three major EEG signal datasets of schizophrenic and healthy patients to get a bigger picture.
- Calculated various statistical measures from the dataset like kurtosis, variance, skewness, etc. to further predict schizophrenia using various supervised machine learning models.
- Compared with contemporary studies to show the significance of larger EEG datasets with more schizophrenic patients and various prediction metrics.
- **Supervisor:** Mr. Mirza Muntasir Nishat

### Students' Mental Wellbeing Prediction in Relation to Mobile Connectivity: A Comprehensive Study
*IUT, BD*

Undergraduate Research Student
*Feb 2022 - Nov 2022*

- Conduction of a survey in order to facilitate the collection of data from the students of IUT to analyze the mental condition during and after COVID times.
- Prediction of their mental health conditions through the utilization of various Machine Learning algorithms.
- **Supervisor:** Mr. Mirza Muntasir Nishat

## Projects

### Malware Detection using GAN based Training
*Online Platform*

Kaggle
*Aug 2022 - Sept 2022*

- Sampled the Androzoo dataset with Generative Adversarial Networks (GAN) which consisted 128 features and 4465 samples.
- Calculated the RMSE and other performance metrics to compare between imbalanced and balanced datasets.
- Competed with 20 teams from all over the world to emerge as the champion.
- **Technical Skills:** Python with Pandas, matplotlib, Seaborn, sklearn.

### Emotion Detection from Bio-signals
*IUT, BD*

Independent Project
*Aug 2021 - Sep 2022*

- Analysis and processing of various bio-signals of humans (ECG, EEG, EDA, etc.) in different emotional states to create a dataset of 1157 samples.
- Training the dataset through several Machine Learning algorithms in order to predict a person's emotion from the bio-signals.
- **Technical Skills:** Python with Numpy, Pandas, matplotlib, Seaborn, sklearn.

## Skills

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|---|---|
| **Programming** | Python (NLTK, SpaCy, Pandas, PyTorch, NumPy, Scikit-learn, TensorFlow, Keras etc.), C, MATLAB, R |
| **Tools** | Microsoft Office, LaTeX(Overleaf), Proteus, Sony Vegas, Adobe After Effects |

## Achievements

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|---|---|---|
| 2024 | **LIS Fellowship,** School of Communication & Information (SC&I), Rutgers - New Brunswick | *USA* |
| 2023 | **Outstanding Paper Award,** Conference on Empirical Methods in Natural Language Processing | *Singapore* |
| 2022 | **1st Place,** IEEE Big Data Cup Challenge - Organized by Khalifa University, UAE | *Online - Kaggle* |
| 2022 | **18th Place,** European Rover Challenge (ERC) - Organized by European Space Foundation | *Kielce, Poland* |
| 2020 | **Best Presentation Award,** Robocon2020 - Organized by GlobalDWS, Canada | *Online* |
| 2020 | **5th Place,** MindExperia 2020 - Organized by Bangladesh University of Professionals Robotics Club | *Bangladesh* |

## Extracurriculars

### IEEE Robotics And Automation Society IUT Student Branch
*IUT, BD*

Vice-Chair
*Nov 2022 - May 2023*

- Affiliated with various university organisations and organised multiple workshops and sessions for the club's sustainable development.
- Arranged intra robotics competition for freshers and sophomore students.

### IUT Mars Rover - Team Avijatrik
*IUT, BD*

Documentation and Public Relations Lead
*July 2022 - May 2023*

- Lead the documentation sub-team in preparing the preliminary and final reports of the team's mars rover.
- Won the regional qualifiers in the prestigious European Rover Challenge 2022, held in Kielce, Poland.
- Got invited as a lead technical innovation in Basis Softexpo 2023 and International Conference on Sustainable Technology for Industries 4.0 (STI 2022).