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Masfiqur Rahaman

Education

2023 - Current, University of California San Diego
PhD student in Data Science

2021 - 2023, Bangladesh University of Engineering and Technology (BUET)
Masters of Science in Computer Science and Engineering

2016 - 2021, Bangladesh University of Engineering and Technology (BUET)
Bachelor of Science in Computer Science and Engineering

Work Experience

Teaching Assistant
Halıcıoğlu Data Science Institute, UCSD, United States
- DSC 291: Mobile and Ubiquitous Computing (September 2025 – Present)
- DSC 40A: Theoretical Foundations of Data Science I (January 2025 – March 2025)
- DSC 100: Intro to Data Management (September 2024 – December 2024)

Graduate Student Research
MOSAIC Lab, Data Science, UCSD, United States (July 2024 - September 2024)

Research Interests

My research interests encompass wearable sensing, ubiquitous computing, and data mining in the application domain of healthcare, climate modeling, and crowd management.

Publications

- **Masfiqur Rahaman**, Maoyejatun Hasana, Shahad Shahriar Rahman, MD Sajid Mostafiz Noor, Razin Reaz Abedin, Md Toki Tahmid, Duncan Watson Parris, Tanzeem Choudhury, A. B. M. Alim Al Islam, and Tauhidur Rahman. Forecasting Occupational Survivability of Rickshaw Pullers in a Changing Climate with Wearable Data. *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT)*, 2026 [Accepted]. [PDF]

- **Masfiqur Rahaman**, Ahmed Mahir Sultan Rumi, Md Shihabul Islam, Tarik Reza Toha, Md. Masum Mushfiq, M. Sohel Rahman, Muhammad Ali Nayeem, Najla Abdulrahman Al-Nabhan, A. B. M. Alim Al Islam. Toward Devising A Multi-Objective Traffic Signal Scheduling Approach for Non-Lane-Based Heterogeneous Traffic. [*IEEE Access*], 2025. DOI: 10.1109/ACCESS.2025.3616266 [PDF]

- **Masfiqur Rahaman**, Md. Nazmul Hasan Sakib, Nafisa Islam, Saiful Islam Salim, Uday Kamal, Rayhan Rashed, and A. B. M. Alim Al Islam. Lets Vibrate with Vibration: Augmenting Structural Engineering with Low-Cost Vibration Sensing. *EAI MobiQuitous*, 2023. DOI: 10.48550/arXiv.2012.04605 [PDF]

- Tarik Reza Toha, **Masfiqur Rahaman**, Saiful Islam Salim, Mainul Hossain, Arif Mohaimin Sadri, and A. B. M. Alim Al Islam. DhakaNet: Unstructured Vehicle Detection using Limited Computational Resources. *IEEE International Conference on Data Mining (ICDM)*, 2021. DOI: 10.1109/ICDM51629.2021.00172 [PDF]

- Md. Masum Mushfiq, Tarik Reza Toha, Saiful Islam Salim, Aaiyeesha Mostak, **Masfiqur Rahaman**, Najla Abdulrahman Al-Nabhan, Arif Mohaimin Sadri, and A. B. M. Alim Al Islam. To Lane or Not to Lane? - Comparing On-Road Experiences in Developing and Developed Countries using a New Simulator RoadBird. *IEEE Transactions on Intelligent Transportation Systems*, 2024. DOI: 10.1109/TITS.2024.3406731 [PDF]

- Adnan Quaium, Najla Abdulrahman Al-Nabhan, **Masfiqur Rahaman**, Saiful Islam Salim, Tarik Reza Toha, Jannatun Noor, Mainul Hossain, Md Shihabul Islam, Ishrat Jahan, and A. B. M. Alim Al Islam. Towards Associating Negative Experiences and Recommendations Reported by Hajj Pilgrims in a Mass-Scale Survey. *Heliyon*, 2023. DOI: 10.1016/j.heliyon.2023.e15486 [PDF]

- Ishrat Jahan, Najla Abdulrahman Al-Nabhan, Jannatun Noor, **Masfiqur Rahaman**, and A. B. M. Alim Al Islam. Leveraging a Smartwatch for Activity Recognition in Salat. *IEEE Access*, 2023. DOI: 10.1109/ACCESS.2023.3311261 [PDF]

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- Saiful Islam Salim, Uday Kamal, Adnan Quaium, Mainul Hossain Yaad, **Masfiqur Rahaman**, Nazmul Hasan Sakib, Md Toki Tahmid, and A. B. M. Alim Al Islam. Long-Range Low-Cost Networking for Real-Time Monitoring of Rail Tracks in Developing Countries. *International Conference on Information & Communication Technologies and Development (ICTD)*, 2022. [PDF]

- Saiful Islam Salim, Najla Abdulrahman Al-Nabhan, **Masfiqur Rahaman**, Nafisa Islam, Tarik Reza Toha, Jannatun Noor, Adnan Quaium, Aaiyeesha Mostak, Mainul Hossain, Md. Masum Mushfiq, and A. B. M. Alim Al Islam. Human-Survey Interaction (HSI): A Study on Integrity of Human Data Collectors in a Mass-Scale Hajj Pilgrimage Survey. *IEEE Access*, 2021. DOI: 10.1109/ACCESS.2021.3103046 [PDF]

- Md. Harunur Rashid Bhuiyan, Iftekhar Morshed Arafat, **Masfiqur Rahaman**, Tarik Reza Toha, and Shaikh Md Mominul Alam. Devising a Vibration-Based Fault Detection System for Textile Machinery *EAI MobiQuitous*, 2022. [PDF]

- Tarik Reza Toha, Najla Abdulrahman Al-Nabhan, Saiful Islam Salim, **Masfiqur Rahaman**, Uday Kamal, and A.B.M. Alim Al Islam. LC-Net: Localized Counting Network for Extremely Dense Crowds. *Applied Soft Computing*, Vol. 123, 2022. DOI: 10.1016/j.asoc.2022.108930 [PDF]

Research Projects

- **Survivability in Extreme Heat and Changing Climate**
  Supervisor: (1) Dr. Tauhidur Rahman, Assistant Professor, Halcolu Data Science Institute, UCSD; (2) Dr. Duncan Watson Paris, Assistant Professor, Halcolu Data Science Institute, UCSD; (3) Dr. A. B. M. Alim Al Islam, Professor, Dept. of CSE, BUET

  - Developed an environmental sensing module to monitor different environmental parameters, such as temperature, humidity, and particulate matters in the air
  - Developed a health condition sensing module to sense heart bit rate, oxygen saturation, electrodermal conductivity, body temperature, etc.
  - Working on data accumulation from rickshaw pullers and analyzing the data.
  - A full paper has been submitted to Nature Scientific Reports.

- **Capillary Health Assessment**
  Supervisor: (1) Dr. Tauhidur Rahman, Assistant Professor, Halcolu Data Science Institute, UCSD; (2) Dr. Rakesh Malhotra, MD, Nephrology, UC San Diego Health

  - Collecting micro circulation images from human nailfold.
  - Preparing an annotated dataset to localize and count capillary loops.

- **Long-Range Rail-Line Monitoring**
  Supervisor: Dr. A. B. M. Alim Al Islam, Professor, Dept. of CSE, BUET

  - Designed an embedded hardware consisting of an array of piezoelectric sensors to collect vibration response of a rail track.
  - Integrated a LoRa module to the embedded hardware for multi-hop networking between nodes and train which is also suitable for developing countries.
  - A conference paper is accepted in ICTD 2022.

- **Hajj Pilgrimage Management**
  Supervisor: Dr. A. B. M. Alim Al Islam, Professor, Dept. of CSE, BUET

  - Performed a mass-scale data collection over 988 Hajj/Umrah pilgrims.
  - Ensured the credibility of responses and integrity of the data collectors through quantitative and collaborative analysis.
  - Identified and ranked major problems and vulnerable groups of pilgrims.
  - A journal paper is published in IEEE Access (DOI: 10.1109/ACCESS.2021.3103046).
  - A manuscript is submitted to Omega.

- **Traffic Management in Non-lane-based and Heterogenous Traffic**
  Supervisor: Dr. A. B. M. Alim Al Islam, Professor, Dept. of CSE, BUET

  - Prepared a traffic image dataset: captured and labelled street-view traffic images.
  - Qualitatively analyze the training and testing performance of a proposed Deep CNN architecture on the prepared dataset.
  - A conference paper is published in ICDM (DOI: 10.1109/ICDM51629.2021.00172).

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Achievements & Awards

- **Merkin Graduate Student Fellowship**, UC San Diego (Spring 2025 - Summer 2025). This Fellowship gives me the opportunity to do research abroad for six months covering living expenses and air travel.
- **ICT Fellowship**, ICT Division, Government of Bangladesh, (2021-2022)
- International AI-based Dhaka Traffic Detection Challenge, 2020, won 5th position among 29 teams from different universities.
- International Conference on Networking, Systems and Security (NSysS), 2021, Runner-up in Student poster presentation session
- Inter College Mathematical Olympiad, 2014, won 3rd position in regional stage
- Technical Scholarship, BUET, Bangladesh, (2016-2020)

Skills & Expertise

- **Programming:** C, C++, Python, Java, Bash, PHP, SQL, HTML, CSS, Intel-8086 Assembly
- **Deep Learning Frameworks:** Tensorflow, Pytorch, Scikit-Learn
- **Software Design Tools & Frameworks:** Amazon EC2, MySQL, Apache, Laravel
- **Simulation & Design Tools:** MATLAB, Proteus, AutoCAD
- **Hardware:** PCB prototyping, Arduino, Raspberry pi
- **Research Proposal Writing:** Have experience in writing proposals for different local and international grants and awards (NIH, Wellcome, Google South & Southeast Asia Research Awards, etc.)

Highlighted Undergrad Projects

- **Predicting Human Count Through Structural Vibration Sensing:** Developed a vibration sensing module for human occupancy estimation in closed environment. [Poster]
- **Vehicle Detection in Highly Congested Traffic of Dhaka City *(Computer Vision)*:** Classified 21 types of vehicle in the streets of Dhaka city. [Video] [Poster]
- **Stack Exchange Question Classification App *(NLP)*:** Collects post from Stack Exchange, Classify question to different category, i.e., Culture, Science, etc. [App, Github, Video]
- **Tough Game *(Reinforcement Learning)*:** Designed and implemented a 2D gaming environment, Trained the agent to avoid multiple enemy blocks. [Github, Video]
- **GSM Based Fire Alarm:** Implemented an MQ2 gas sensor circuit, Able to send message to phone on fire event. [Video]
- **C Compiler:** Developed a compiler for a subset of C language covering variables, conditions, functions, recursions and symbol table. Performed lexical analysis using Flex and syntactic analysis using Bison. [Github]
- **Line Following Bot:** Design and hardware implementation of a robot capable of following a black line using Arduino. [Video]
- **MIPS 4 Bit Processor:** Design and simulation of a 4bit computer capable of executing 12 different instructions using Logisim simulator.
- **4 bit Breadboard ALU:** Design and hardware implementation of a 4 bit Arithmetic and Logic Unit on breadboard.
- **File Compressor:** Implemented Huffman encoding for text file compression and decompression using C.

References

- Dr. Tauhidur Rahman
  Assistant Professor, Halıcıoğlu Data Science Institute, University of California San Diego, California, United States
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  Homepage: https://www.tauhidurrahman.com/

- Dr. A. B. M. Alim Al Islam
  Professor, Dept. of Computer Science and Engg., BUET, Dhaka, Bangladesh
  Email: alim_razi@cse.buet.ac.bd
  Homepage: https://cse.buet.ac.bd/faculty/facdetail.php?id=razi

- Dr. Duncan Watson-Parris
  Assistant Professor, Halıcıoğlu Data Science Institute, University of California San Diego, California, United States
  Email: dwatsonparris@ucsd.edu
  Homepage: https://duncanwp.github.io/