Md Ruman Islam

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Education

- **University of Nebraska Omaha (UNO)** — Omaha, NE, USA
  M.Sc. and Ph.D. in Computing & Information Science. — *Aug. 2022 - Present*
- **University of Nebraska Omaha (UNO)** — Omaha, NE, USA
  M.Sc. and Ph.D. in Computer Science. — *Aug. 2022 - Expected Graduation Dec. 2024*
- **Shahjalal University of Science and Technology (SUST)** — Sylhet, Bangladesh
  B.Sc. in Computer Science and Engineering. — *Apr. 2014 - Dec. 2018*

Working Experience

- **University of Nebraska Omaha (UNO)**
  Graduate Research Assistant — *July 2023 - Present*
  - **Supervisor**: Dr. Pei-Chi Huang, Assistant Professor, Dept. of Computer Science, UNO.
  - **Working Field**: Digital Twin, DL based Networking Congestion Control, Cyber Physical System.
- **University of Nebraska Omaha (UNO)**
  Graduate Research Assistant — *Aug. 2022 - June 2023*
  - **Supervisor**: Dr. Spyridon Mastorakis, Assistant Professor, Dept. of Computer Science, UNO.
  - **Working Field**: Networking Security and Privacy, Virtual Reality Privacy, ML for IoT's Congestion Control.
- **Samsung R&D Institute Bangladesh**
  Software Engineer — *Dec. 2018 – Jul. 2022*
  - **Working Field**: Fetching, parsing, storing and showing the cloud data to the users; Communicating with IoT devices; Onboarding the IoT devices to the cloud; optimizing the Onboarding System.

Research Interests

Cybersecurity, Cyber-Physical System, Machine Learning (ML).

Publications

- M. R. Islam, R. H. Anwar, S. Mastorakis, and M. T. Raza, "Characterizing Encrypted Application Traffic through Cellular Radio Interface Protocol," in *arXiv preprint arXiv:2407.07361*, 2024.
  Status: Accepted for publication by the 21st IEEE International Conference on Mobile Ad-Hoc and Smart Systems (MASS 2024). See the accepted paper list.
- M. R. Islam, M. Subramaniam, and P.-C. Huang, "Image-based Deep Learning for Smart Digital Twins: a Review," in *arXiv preprint arXiv:2401.02523*, 2024.
  Status: Accepted by *Artificial Intelligence Review* in October 2024. Link to journal.
- D. Zhang, M. R. Islam, P.-C. Huang, and C.-H. Ho, "Overcoming Autoware-Ubuntu Incompatibility in Autonomous Driving Systems-Equipped Vehicles: Lessons Learned," in *arXiv preprint arXiv:2410.06492*, 2024.
- M. R. Islam, M. A. Kashem, and L. Mia, "AllerHybrid: A Hybrid System to Predict the Allergen Using K-mer and Physicochemical Properties," in *2021 5th International Conference on Electrical Engineering and Information Communication Technology (ICEEICT)*, 2021, pp. 1-6. doi: 10.1109/ICEEICT53905.2021.9667943.
  Github: GitHub Repository

Awards and Recognitions

- **Graduate Research and Creative Activity (GRACA) Grant, University of Nebraska Omaha 2024-2025**: Awarded $5,000 to conduct research on Autonomous Vehicles.
- **Graduate Research and Creative Activity (GRACA) Grant, University of Nebraska Omaha 2023-2024**: Awarded $5,000 to conduct research on Real-Time Communication Congestion Control.
- **SRBD Icon of the Month, Samsung R&D Institute Bangladesh (SRBD) March-April 2020**: Recognized for exceptional contributions to the Samsung SmartThings project.

Skills and Languages

- **Languages Spoken**: Bangla, English, Hindi (Beginner)
- **Programming Languages**: Swift, C, C++, Python, SwiftUI, Java, PHP, HTML, CSS, JavaScript, FXML
- **Development Environments and Frameworks**: Git, Xcode, NS3, Autoware.AI, Wireshark, QXDM, Scikit-learn, TensorFlow, MATLAB, Jupyter Notebook, Laravel, Firebase, OpenCV, PyQt, Bootstrap, React, OpenAI Gym
- **Databases**: MySQL, Firebase
- **Libraries and APIs**: OpenCV, PlantUML, OpenFace, graphics.h library
- **Platforms**: iOS, Linux, Raspberry Pi, Android, Oculus (VR), Mac OS, Windows
- **Collaboration and Project Management Tools**: Slack, Jira

Projects

- **Smart Motion Detection with Telegram Notifications and Efficient Storage Management** *(Platform-* Raspberry Pi)): We have developed a surveillance system that employs a Raspberry Pi and Pi Camera, integrated with Telegram messaging, for efficient storage management and real-time alerting.

  Tools and Language Used: Python, OpenCV, Raspberry Pi, PIR Motion Sensor, Pi Camera, Telegram.

- **A Survey and a Roadmap on Machine Learning in Congestion Control**: Done a feasibility-based study under the guidance of Dr. Spyridon Mastorakis to implement ML-based congestion control for IoT devices.

  Tools and Language Used: Python, Java

- **TCP Socket** *(Platform-* Oculus Quest 2, MacBook): TCP client and server socket implementation using Java for Android devices and Python for PCs.

  Tools and Language Used: Python, Java

- **Semester Counter** *(Platform-* IoT, Web): An IoT and Web-based system which can count the academic semester for the students and teachers of the Department of Computer Science and Engineering, Shahjalal University of Science and Technology.

  Tools and Language Used: PHP, MySQL, HTML, CSS, Bootstrap, Arduino.

- **Pantry Inventory** *(Platform-* Android, Firebase): The Pantry Inventory App is an Android application developed using Java and Android Studio with Firebase integration for user authentication and data storage. It allows users to manage their pantry items by receiving timely notifications for expiring items.

  Tools and Language Used: Java.

- **Image-Based Book Recommendation System**: Developed an innovative book recommendation system integrating image processing and machine learning. Utilized CNN for feature extraction from book covers and employed the k-NN algorithm for recommendations.

  Tools and Language Used: Python, TensorFlow

- **Categorise Social Media Profile**: Categorised the Social Media Profile based on their Bangla post on Facebook using CNN and RNN models.

  Tools and Language Used: Python, TensorFlow, Keras and Jupyter Notebook

- **Bangla Document Categorization**: Categorized the Bangla documents based on their types using Random Forest Classifier, Linear SVC, MultinomialNB, and Logistic Regression algorithms. It can categorize the bang It can categorize the Bangla documents 90.6% accurately on Linear SVC.

  Tools and Language Used: ML algorithms, Python, Jupyter Notebook.

- **Word2vec**: Implemented the CBOW and SKIP-GRAM models using TensorFlow and Keras.

  Tools and Language Used: Python, TensorFlow, Keras, Jupyter Notebook

- **Sentiment Analysis**: Analysed the sentiment of Facebook's users based on their Bangla comments on Facebook. Used the Multinomial Naive Bayes, Logistic Regression, Linear SVC, and Multi-layer Perceptron classifier for analyzing the sentiment. It can categorize the sentiment of a user 80.4% accurately on Linear SVC.

  Tools and Language Used: ML algorithms, Python, Jupyter Notebook.

- **Taste Of Honey** *(Platform-* Windows): Three levels desktop-based game and, it is the initial project of my undergraduate years. I have secured the top grade in this project.

  Tools and Language Used: C++, graphics.h library.

- **Face Finder** *(Platform-* Linux): It is an AI-based application for photographers to separate the images of a particular person. If a user inputs the sample photo of any person, it can separate all of the photos of that person.

  Tools and Language Used: OpenFace, Python, PyQt.

- **Mac Window Manager** *(Platform-* Mac): An application for mac to manage the window.

  Tools and Language Used: SwiftUI, Xcode

- **Question Bank** *(Platform-* Web): a web application for the students and teachers of the Department of Computer Science and Engineering, Shahjalal University of Science and Technology, for archiving the question papers. It helps the students and teachers understand a subject's standard question.

  Tools and Language Used: PHP, Laravel, MySQL, HTML, CSS, JavaScrip, Bootstrap.

- **OS Scheduling algorithms** *(Platform-* Windows): A desktop application for visualizing the OS Scheduling algorithms.

  Tools and Language Used: Java, FXML.