Riyad Bin Rafiq

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Education

- **University of North Texas** *Jan'21 - Dec'25*
  Ph.D. Candidate in Computer Science and Engineering; Cumulative GPA: 4.0 (Present)
  Co-advisor: Mark V. Albert, Ph.D
  Co-advisor: Weishi Shi, Ph.D

- **University of North Texas** *Jan'21 - May'24*
  Master of Science in Artificial Intelligence - Machine Learning

- **Chittagong University of Engineering and Technology** *Mar'14 - Dec'18*
  Bachelor of Science in Computer Science and Engineering

Experience

- ***Graduate Research Assistant, Biomedical AI Lab*** *Jan'21 - Present*
  - **Wearable Gesture Recognition System:** We are working on a fast and flexible gesture recognition system that uses wearable sensor data from motor-impaired people who cannot speak. The primary focus is enhancing the custom gesture learning strategy by implementing transfer learning, meta-learning, and continual learning techniques using a few training examples [1, 2].

  - **Rehabilitation and ML Validation:** Our recent work in patient-reported outcomes evaluated the feasibility of using computerized adaptive testing (CAT) on tablet computers for rehabilitation inpatients, focusing on staff workload and the prevalence of elevated T-scores across six PROMIS measures [3]. The ML validation work provided an overview of common limitations in machine learning model validation methods within medicine, proposing solutions to enhance the reliability of these models for medical applications [4].

- ***Graduate Teaching Assistant, University of North Texas*** *Jan'21 - May'23*
  - **CSCE 5218 Deep Learning:** Utilized minitorch to prepare assignments and assisted students in completing and understanding them. Additionally, I graded assignments and offered explanations for topics students may have missed during class.

  - **CSE 5280 AI for Wearables and Healthcare:** Provided students guidance throughout the project process, from brainstorming ideas to final implementation. Additionally, I assisted instructors in creating exam questions and graded student assignments.

  - **CSCE 1030 Computer Science I:** Spent three hours instructing a lab class where I helped freshman students solve programming problems utilizing C++. I also assisted students in completing their projects.

  - **NSF-ReU Summer Research:** During a 10-week summer research program, I guided undergraduate and graduate students, facilitating their research activities and assisting in implementing ideas.

  - **Other courses:** CSCE 5215 Machine Learning (Spring'22), CSCE 4110 Algorithms (Spring'22).

- ***Software Engineer, JMJ CODE*** *Oct'20 - Dec'20*
  - **Application development:** Contributed to developing different modules of a web application for online vendors. Technologies: ASP .Net, HTML, CSS, Javascript, MySQL.

- ***Research Student*** *Jan'18 - Mar'19*
    - ***OptiFit:*** Research on implementing a smartphone application, *OptiFit* that provides the functionality to automatically measure the four essential dimensions (length, width, arch height, and instep girth) of a human foot from images and 3D scans [5].
    - **Vision-based Bengali Sign Language Detection:** Implemented a real-time automated translation system utilizing Convolutional Neural Networks to translate Bengali sign language into Bengali words. Our system operates seamlessly on common computing environments, such as a computer and a generic webcam [6].

Technical Knowledge

- Machine Learning and Deep Learning: Python, Tensorflow, Keras, Scikit-learn
- Android Application Development
- Web Application Development: HTML, CSS, Javascript, ASP .NET

Publications

[1] **Rafiq RB,** Shi W, Albert MV (2024). "Wearable Sensor-Based Few-Shot Continual Learning on Hand Gestures For Motor-Impaired Individuals via Latent Embedding Exploitation". *33rd International Joint Conference on Artificial Intelligence (IJCAI).*

[2] **Rafiq RB,** Karim SA, Albert MV (2023). "An LSTM-based Gesture to Speech Recognition System". *IEEE 11th International Conference on Healthcare Informatics*.

[3] **Rafiq RB,** Yount S, Jerousek S, Roth EJ, Cella D, Albert MV, Heinemann AW (2023). "Feasibility of PROMIS using Computerized Adaptive Testing during Inpatient Rehabilitation". *Journal of Patient-Reported Outcomes, 7 (1), 1-9.*

[4] **Rafiq RB,** Modave F, Guha S, Albert MV (2020). "Validation Methods to Promote Real-world Applicability of Machine Learning in Medicine". *3rd International Conference on Digital Medicine and Image Processing, pages 13-19*

[5] **Rafiq RB**, Hoque KM, Kabir MA, Ahmed S, Laird C (2022). "*OptiFit*: Computer Vision-based Smartphone Application to Measure the Foot from Images and 3D Scans". *Sensors 22 (23), 9554.*

[6] **Rafiq RB,** Hakim SMA, Tabashum T (2021). "Real-time Vision-based Bangla Sign Language Detection Using Convolutional Neural Network". *10th International Conference on Advances in Computing and Communications, pages 1-5.*

Poster Presentations

- **Rafiq RB**, Karim SA, Liu A, Albert MV. "A gesture-to-speech recognition mobile application prototype" American Congress of Rehabilitation Medicine (ACRM 2021) Sep 26-29, 2021.
- **Rafiq RB**, Modave F, Guha S, Albert MV. "Validation Methods to Promote Real-world Applicability of Machine Learning in Medicine" ACM Tapia Conference Sep 16-19, 2020.

Relevant Certification and Course

- Deep Learning, Spring'22, UNT.
- Machine Learning, Fall'21, UNT.
- AI for Wearables and Healthcare, Fall'21, UNT.
- Deep Learning by Neuromatch Academy, Summer'21.
- Software Development for AI, Spring'21, UNT.
- Deep Learning, Machine Learning, IBM Data Science; Coursera 2019-20.