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: 3.89 (Present)
  Co-advisor: Mark V. Albert, Ph.D
  Co-advisor: Weishi Shi, Ph.D

- **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 for 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 delves into advancements in patient-reported outcomes and the validation of machine learning models in medicine. The first study 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 second study 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. Additionally, I offered explanations on relevant topics essential for their research endeavors.

  - **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.