

MOHAMMAD RAIHANUL BASHAR

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Research Interests

I am a PhD candidate at Concordia University. My research lies at the intersection of **Human-Computer Interaction**, Computer Graphics, and **Extended Reality**. My goal is to **empower human imagination and cognition** through XR and AI by enabling the world itself to function as an interactive medium for exploration and expression.

Keywords: XR x AI · Human-AI Interaction · Multimodal Interaction

Education

- 2026 Exp. **Ph.D. in Computer Science (ABD)**
Department of Computer Science & Software Engineering, Concordia University
Advised by: Dr. Anil Ufuk Batmaz
- 09/2023 – **MSc in Computer Science**
12/2023 Department of Computer Science & Software Engineering, Concordia University
Fast-track to PhD
Supervisor: Dr. Anil Ufuk Batmaz
- 01/2013 – **BSc in Computer Science**
08/2017 Department of Computer Science, Independent University, Bangladesh
Effect of EMG Artifacts on Video Category Classification from EEG
Advisor: Prof. M. Ashraful Amin

Publications

Papers with future publication dates are accepted to appear in their respective venues.

Book Chapters

- 2017 [B. 1] Computational Intelligence for Pattern Recognition in EEG Signals. Aunnoy K Mutasim, Rayhan Sardar Tipu, **Mohammad Raihanul Bashar**, Md Kafiul Islam, M. Ashraful Amin. *Computational Intelligence for Pattern Recognition*, Springer-Verlag.

Peer-Reviewed Hybrid Conference-Journal Articles

- 2026 [J. 5] Evaluating the Vergence–Accommodation Conflict in Gaze-Based 3D Target Selection. **Mohammad Raihanul Bashar**, Mohammadreza Amini, Aunnoy K Mutasim, Mayra Donaji Barrera Machuca, Wolfgang Stuerzlinger, and Anil Ufuk Batmaz. (*TVCG (IEEE ISMAR’ 26)*).
- 2025 [J. 4] An Early Warning System Based on Visual Feedback for Light-Based Hand Tracking Failures in VR Head-Mounted Displays. **Mohammad Raihanul Bashar**, Anil Ufuk Batmaz. (*TVCG (IEEE VR’ 25)*).

Peer-Reviewed Journal Articles

- 2025 [J. 3] The Effect of Visual Depth on the Vergence-Accommodation Conflict on 3D Selection Performance within Virtual Reality Headsets. **Mohammad Raihanul Bashar**, Mayra Donaji Barrera Machuca, Wolfgang Stuerzlinger, Anil Ufuk Batmaz. *The Visual Computer, Springer-Verlag*.
- 2023 [J. 2] EEG-Based Preference Classification for Neuromarketing Application. Injamamul Haque Surov, Faiyaz Alvi Ahmed, Md. Tawhid Islam Opu, Aunnoy K Mutasim, **M. Raihanul Bashar**, Rayhan Sardar Tipu, M Ashraful Amin, and Md Kafiul Islam. *Computational Intelligence and Neuroscience*.
- 2020 [J. 1] Use of spontaneous blinking for application in human authentication. Amir Jalilifard, Dehua Chen, Aunnoy K Mutasim, **M. Raihanul Bashar**, Rayhan Sardar Tipu, Md. Ahsan-Ul Kabir Shawon, Nazmus Sakib, M Ashraful Amin, and Md Kafiul Islam. *Engineering Science and Technology, an International Journal, Elsevier*.

Peer-Reviewed Conference Proceedings

- 2026 [U-2] GenUI Design Space. (planned for CHI 27)
- 2026 [U-1] Parallel Multi-selection in XR. (planned for CHI 27)
- 2026 [C.10] Crossing Realities Has a Cost: Evaluating AR Second Screens for AI-Assisted Desktop Authoring. Mucahit Gemici, **Mohammad Raihanul Bashar**, Wolfgang Stuerzlinger, Vrushank Phadnis, Anil Ufuk Batmaz. (*ACM SUI’ 26*).
- 2026 [C.9] Play and Learn: Gamified Feedback for Ultrasound-Guided Catheter Insertion Training in Virtual Reality. **Mohammad Raihanul Bashar**, Anil Ufuk Batmaz. (*IEEE SeGAH’ 26*).
- 2026 [C.8] Eyes on Many: Evaluating Gaze, Hand, and Voice for Multi-Object Selection in Extended Reality. **Mohammad Raihanul Bashar**, Aunnoy K Mutasim, Ken Pfeuffer, Anil Ufuk Batmaz. (*CHI’ 26*).

- 2025 [C.7] There Is More to Dwell Than Meets the Eye: Toward Better Gaze-Based Text Entry Systems With Multi-Threshold Dwell. Aunnoy K Mutasim, **Mohammad Raihanul Bashar**, Christof Lutteroth, Anil Ufuk Batmaz, Wolfgang Stuerzlinger. (*CHI' 25*).
- 2024 [C.6] Virtual Task Environments Factors Explored in 3D Selection Studies. **Mohammad Raihanul Bashar**, Anil Ufuk Batmaz. (*ACM GI' 24*).
- 2018 [C. 5] Effect of Artefact Removal Techniques on EEG Signals for Video Category Classification. Aunnoy K Mutasim, **Mohammad Raihanul Bashar**, Rayhan Sardar Tipu, Md Kafiul Islam, M. Ashraful Amin. 24th International Conference on Pattern Recognition (*ICPR' 18*).
- 2018 [C.4] Effect of EMG Artifacts on Video Category Classification from EEG. **Mohammad Raihanul Bashar**, Rayhan Sardar Tipu, Aunnoy K Mutasim, M. Ashraful Amin. (*ICIEV*) & (*icIVPR*).
- 2017 [C.3] Video Category Classification Using Wireless EEG. Aunnoy K Mutasim, Rayhan Sardar Tipu, **Mohammad Raihanul Bashar**, M. Ashraful Amin. (*BI' 17*).
- 2017 [C.2] Implementation of Low Cost Stereo Humanoid Adaptive Vision for 3D positioning and Distance Measurement for Robotics Application with Self-calibration. Abul Al Arabi, Rayhan Sardar Tipu, **Mohammad Raihanul Bashar**, Binoy Barman, Shama Ali Monica, M. Ashraful Amin. (*AMS' 17*).
- 2017 [C. 1] 2D Surface Mapping for Mine Detection via Wireless Networking. **Mohammad Raihanul Bashar**, Abul Al Arabi, Rayhan Sardar Tipu, Md Tanvir Alam Sifat, Md Zobair Ibnaalam, M. Ashraful Amin. (*ICCRE' 17*).

Peer-Reviewed Conference Poster Abstracts

- 2026 [A.2] Effects of Visual Depth on Vergence–Accommodation Conflict in Gaze- and Controller-Based Selection in Virtual Reality. **Mohammad Raihanul Bashar**, Mohammadreza Amini, Aunnoy K Mutasim, Mayra Donaji Barrera Machuca, Wolfgang Stuerzlinger, Anil Ufuk Batmaz. (*CHI EA' 26*).
- 2025 [A.1] Depth3DSketch: Freehand Sketching Out of Arm's Reach in Virtual Reality. **Mohammad Raihanul Bashar**, Mohammadreza Amini, Wolfgang Stuerzlinger, Mine Sarac, Ken Pfeuffer, Mayra Donaji Barrera Machuca, Anil Ufuk Batmaz. (*CHI EA' 25*).

Peer-Reviewed Workshop Proceedings

- 2024 [W.1] Subtask-Based Virtual Hand Visualization Method for Enhanced User Accuracy in Virtual Reality Environments. Laurent Voisard, Amal Hatira, **Mohammad Raihanul Bashar**, Mucahit Gemici, Mine Sarac, Marta Kersten-Oertel, Anil Ufuk Batmaz. (*NIDIT' 24*).

Research Experience

- 12/2022 – **EXiT Lab**, Concordia University, Graduate Student Researcher. Montreal, QC. Advisor: Dr. Anil Ufuk Batmaz. Driving research agenda on pushing the frontier of human interaction in eXtended Reality by developing interaction systems that empower human creativity. Publishing at top-tier HCI conferences.
- 01/2019 – **AGenCy Lab, IUB**, Independent University, Bangladesh, Research Assistant. Dhaka, BD. Advisor: Prof. M. Ashraful Amin. Develop a high-quality, standardized medicine image dataset with metadata, deploy a recognition model to enhance feature selection, and create a mobile application to assist visually impaired patients in identifying their prescribed pills. Work led to opensource code [O. 3].
- 12/2021
- 01/2018 – **Computer Vision & Cybernetics, BD**, Independent University, Bangladesh, Research Assistant. Dhaka, BD. Advisor: Prof. M. Ashraful Amin. The goal was to compile a dataset of Bengali letters and numbers for Bangladeshi license plates and develop a custom ANPR system, successfully addressing the lack of open-source datasets and enabling accurate recognition of Bangladeshi license plates. Work led to opensource code [O. 2].
- 12/2019
- 04/2016 – **Computer Vision & Cybernetics, BD**, Independent University, Bangladesh, Undergraduate Research Assistant. Dhaka, BD. Advisor: Prof. M. Ashraful Amin. With the vision of building a BCI-based video recommender system, we experimented with several state-of-the-art algorithms for each of the submodules (pre-processing, feature extraction, feature selection, and classification) of the Signal Processing module of a BCI system to find out what combination of algorithms best predicts what type of video a person is watching. Work led to publication at BI 2017 [C. 3], ICIEV 2017 [C. 4], ICPR 2018 [C. 5] and a Book Chapter [B. 1] and opensource code [O. 1].
- 01/2018

Teaching

Instructor

- Winter 2026 **SOEN 287: Web Programming (Undergraduate)**
Department of Computer Science and Software Engineering, Concordia University

Teaching Assistant

- Summer 2026 **SOEN 6011: Software Engineering Process (Graduate)**
Instructor: Dr. Pankaj Kamthan
Department of Computer Science and Software Engineering, Concordia University

Summer 2026	COMP 248: Introduction to Programming (Undergraduate) Instructor: Dr. Pankaj Kamthan Department of Computer Science and Software Engineering, Concordia University
Summer 2026	SOEN 6471: Advanced Software Architectures (Graduate) Instructor: Dr. Pankaj Kamthan Department of Computer Science and Software Engineering, Concordia University
Winter 2026	COMP 6741: Intelligent Systems (Graduate) Instructor: Dr. Pankaj Kamthan Department of Computer Science and Software Engineering, Concordia University
Fall 2025	COMP 5201: Computer Organization and Assembly Language (Graduate) Instructor: Dr. David K. Probst Department of Computer Science and Software Engineering, Concordia University
Fall 2025	COMP 472: Introduction to Artificial Intelligence (Undergraduate) Instructor: Dr. Kefaya Qaddoum Department of Computer Science and Software Engineering, Concordia University
Fall 2023, 2024, 2025	COMP 376: Introduction to Game Developments (Undergraduate) Instructor: Dr. Anil Ufuk Batmaz Department of Computer Science and Software Engineering, Concordia University
Winter 2024	COMP 6331: Advanced Game Developments (Graduate) Instructor: Dr. Anil Ufuk Batmaz Department of Computer Science and Software Engineering, Concordia University
Winter 2024	SOEN 6751: Human-Computer Interaction (Graduate) Instructor: Dr. Anil Ufuk Batmaz Department of Computer Science and Software Engineering, Concordia University
Fall 2018	CSE 420: Image Processing & Pattern Recognition (Undergraduate) Instructor: Prof. M. Ashraful Amin Department of Computer Science and Engineering, Independent University, Bangladesh.
Fall 2018	CSE 417: Data Mining and Warehouse (Graduate) Instructor: Dr. Moinul Zaber Department of Computer Science and Engineering, Independent University, Bangladesh.

Industry Experience

- Fall 2024 **Mitacs Accelerate Internship**, Research Intern. Remote. SonoNurse Inc., Concordia University, Montreal, QC.
Developed a gamified virtual reality (VR) training system for ultrasound-guided intravenous catheter insertion, incorporating real-time feedback and interaction design to enhance procedural learning. Led system design and implementation, resulting in a peer-reviewed publication [C.9].
- 05/2022 – 08/2023 **Senior Engineer, MLOps.** Quantigo AI, Dhaka, Bangladesh. Led the development and launch of two web applications, including a workforce management system, while providing customized ML-assisted data annotation solutions, developing an in-house video annotation platform, and establishing foundational architectures for current and future projects.
- 07/2021 – 03/2022 **Senior AI Engineer.** OPUS Technology Limited, Dhaka, Bangladesh. Developed an intelligent agent for CS:GO using offline RL, supervised the creation of an e-sports game prediction system, implemented a matchmaking system with AWS Gamelift, streamlined MLOps integration with cloud platforms, mentored the ML team on RL and clean coding practices, and maintained the company's largest project while contributing reusable modular-helper classes.
- Summer 2021 **Machine Learning Engineer.** Expert Consortium Limited, Dhaka, Bangladesh. Developed an early shoplifting detection system prototype.
- 11/2020 – 03/2021 **Software Engineer.** Maxis Systems Limited, Dhaka, Bangladesh. Integrated a DevOps pipeline as the development platform, developed scalable and maintainable microservice solutions, and built a platform for business analytics leveraging ML and Data Science.

Awards and Scholarships

- 2026 **GCS Conference Travel Support, CAD 500**, Gina Cody School of Engineering and Computer Science, Concordia University
- 2025 **Concordia Conference and Exposition Allowance, CAD 1000**, School of Graduate Studies, Concordia University
- 2025 **Concordia Conference and Exposition Allowance, CAD 1000**, School of Graduate Studies, Concordia University
- 2024 **Concordia Conference and Exposition Allowance, CAD 750**, School of Graduate Studies, Concordia University
- 2024 **FRS Scholarship for PhD Student, CAD 22,000/year**, Concordia University

2024	Concordia International Tuition Award of Excellence, CAD 44,893 , Concordia University
2023	FRS Scholarship for MSc Student, CAD 24,000/year , Concordia University
2023	Concordia Merit Scholarship, CAD 5,000 , Concordia University
2017	SECS Award , Independent University, Bangladesh

Service

Service items with future dates are confirmed commitments.

Leadership & Organizing Roles

2026	Session Chair (Driving Innovation) , ACM CHI 2026
2026	Poster Associate Chair (AC) , ACM CHI 2026, ACM SUI 2026
2025	Student Volunteer Chair , ACM SUI 2025
2026	Workshop Organizer , NIDIT @ IEEE VR 2026

Program Committee

2026	Program Committee Member , ACM SUI, ISS
2026 – 2027	Program Committee Member , ACM IUI
2025	Program Committee Member , ACM MUM

Reviewing

2026	Reviewer: CHI (<i>Special Recognition</i>), ISMAR, UIST, TVCG, MobileHCI, ICMI, SUI, VRST
2025	Reviewer: IEEE VR, CHI LBW, ISMAR, UIST, VRST, TVCG
2024	Reviewer: SUI, ISMAR, MobileHCI, CHI

Community & Outreach

2025	Presenter , Girls Summer Engineering and Technology Program (GirlSET), Concordia University
2024	Presenter , Girls Summer Engineering and Technology Program (GirlSET), Concordia University

Skills

I have expertise in developing interactive XR and AI systems, as well as full-stack web development, encompassing both frontend and backend. Additionally, I have experience in designing, training, and evaluating deep learning models. I am familiar with the following programming languages, frameworks, and research methodologies.

Programming Languages: Python, C++, C#, HTML/CSS/JavaScript

Frameworks: PyTorch, Scikit-Learn, Unity, Unreal, OpenXR, Flask, React

Research Methodologies: User Studies (quantitative/qualitative), DL experiments.

References

Anil Ufuk Batmaz, Ph.D.

Assistant Professor

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Wolfgang Stuerzlinger, Ph.D.

Professor

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