Mucahit Gemici

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Research Interests

Human-Computer Interaction, Virtual Reality, Augmented Reality, Cross Reality, Hybrid Interfaces, AI Assistive Systems, Game Technologies.

Education

Ph.D. in Computer Science Jan 2024 – Present
Concordia University

- **Advisor:** Anil Ufuk Batmaz
- **Research Focus:** Hand Tracking Failures in VR, Immersive AI Assistive Systems, Hybrid User Interfaces for Creative Applications

B.S. in Electrical & Electronics Engineering [2022]
Kadir Has University

- **Senior Project:** MuscleNET: Smart Predictive Analysis for Muscular Activity Using Wearable Sensors (ASYU'22)
- **Relevant Coursework:** Computer Programming, Game Programming, Circuit Design, Microprocessors, Design of Experiments, Signal Processing.

Technical Skills

- **Interactive Development:** Unity 3D (C#), Unreal Engine
- **Hardware & Electronics:** Microcontrollers (Arduino), Circuit Design, Soldering, Signal Processing, IoT.
- **Research Methods:** Experimental Design (Within-subjects, Latin Square), Statistical Analysis (ANOVA, t-tests, Wilcoxon, Friedman), User Studies.
- **Data & Tools:** Python, C#, C, LaTeX, Git, Figma, Blender, Unity, HTML/CSS/Javascript, JMP, SPSS.

Research Experience

Visiting Researcher (Incoming) Summer 2026
Nara Institute of Science and Technology (NAIST) *Nara, Japan*

- Recipient of the prestigious **Mitacs Global Research Internship Award**.
- Joining the **Cybernetics and Reality Engineering (CARE) Laboratory** under the supervision of **Prof. Kiyoshi Kiyokawa**.
- **Project:** "Mitigating Detrimental Effects of Vergence Accommodation Conflict (VAC) in Stereo Displays."

Ph.D. Researcher Jan 2024 – Present
Concordia University *Montreal, QC, Canada*

- **Google-Funded Projects:** Engineered an early-warning system for common hand-tracking failures in VR. Detected tracking loss before it occurs and provided visual feedback to reduce tracking loss and improve user experience. Also, I used eye-tracking and user behavior logging, analyzed user reaction for early warnings. Resulted publications in *PLOS ONE and IEEE Access*.
- Designed and validated novel interaction techniques for "Mid-Air Object Manipulation," implementing algorithms for **Object Speed Control** to enhance user precision. (Published at *ISMAR 2024*).
- Developed high-fidelity experimental testbeds in **Unity (C#)**, ensuring consistent performance to maintain ecological validity during user studies.
- Conducted mixed-methods user studies for each of my papers.

Undergraduate Researcher 2021 – 2022
Kadir Has University *Istanbul, Turkey*

- **MuscleNET (Best Graduation Project Award):** Engineered a wearable system using Arduino/MyoWare and **Deep Neural Networks** and **LSTM Networks** to predict injuries and to evaluate training quality; results published in *IEEE ASYU'22*.
- **Academic Excellence:** Graduated as the **Top Ranking Student (GPA: 3.94/4.00)** in Kadir Has University among all departments & faculties.

Professional Experience

Mobile Game Developer June 2022 – June 2023
Servo Studios *Istanbul, Turkey*

- Engineered and shipped 5 mobile titles, achieving +10,000 downloads and 0.31$ CPI (cost-per-install).
- Optimized frame rate and memory usage for low-end devices; skills now applied to optimizing real-time research simulations.
- Implemented user behavior tracking systems to track user engagement, providing a foundation for quantitative user research.
- Collaborated with design teams from mobile game publisher Moonee to prototype game designs and UI/UX, translating wireframes/design documents into responsive, interactive applications.

Teaching Experience

Teaching Assistant Jan 2024 – Present
Concordia University *Montreal, QC*

- **COMP 476: Advanced Game Development**
  - **Winter 2026 (Incoming):** Lab Demonstrator.
  - **Winter 2025 (Marker):** Graded assignments, project demos, and presentations for Dr. A.U. Batmaz.
  - **Winter 2024 (Lab Instructor):** Taught 2 lab sections on practical game programming patterns.
- **COMP 376: Introduction to Game Development**
  - **Fall 2025 (Lab & Marker):** Taught 2 lab sections and graded projects for Dr. Joachim Despland-Lichtert.
  - **Fall 2024 (Lab Instructor):** Taught foundational game programming (1 section) for Dr. A.U. Batmaz.
- **SOEN 287: Web Programming**
  - **Winter 2026 (Incoming):** Marker.

Volunteering & Service

Student Volunteer Chair November 2025
ACM Symposium on Virtual Reality Software and Technology (VRST '25) *Montreal, QC, Canada*

- Coordinated the student volunteer team to support conference operations.
- Managed the end-to-end logistics for conference merchandise, leading the **design, ordering, and shipping** of T-shirts and hoodies.

Event Volunteer (GirlSET) July 2024 & July 2025 (2 times)
Concordia University *Montreal, QC, Canada*

- Participated in the **GirlSET** outreach program (coordinated by Dr. Bahareh Goodarzi).
- Presented personal research and previous studies to the public to promote STEM engagement.

Publications

[1] Doesburg, D., **Gemici, M.**, & Batmaz, A. U. (2025, November). Landing Windows Method as Soft Visual Constraints for Mid-Air Interactions. In Proceedings of the 2025 ACM Symposium on Spatial User Interaction (pp. 1-12).

[2] **Gemici, M.**, Hatira, A., Phadnis, V., & Batmaz, A. U. (2025). Gaze Analysis in Early Warning Visual Feedback System for Hand Tracking Failures in Virtual Reality. IEEE Access.

[3] **Gemici, M.**, Phadnis, V., & Batmaz, A. U. (2025). Before hands disappear: Effect of early warning visual feedback method for hand tracking failures in virtual reality. PLoS One, 20(6), e0323796.

[4] **Gemici, M.**, Stuerzlinger, W., & Batmaz, A. U. (2024, October). Object Speed Control with a Signed Distance Field for Distant Mid-Air Object Manipulation in Virtual Reality. In 2024 IEEE International Symposium on Mixed and Augmented Reality (ISMAR) (pp. 465-474). IEEE.

[5] Voisard, L., Hatira, A., Bashar, M. R., **Gemici, M.**, Sarac, M., Kersten-Oertel, M., & Batmaz, A. U. (2024, March). Subtask-Based Virtual Hand Visualization Method for Enhanced User Accuracy in Virtual Reality Environments. In 2024 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW) (pp. 6-11). IEEE.

[6] **Gemici, M.**, Korkmaz, K., Ayhan, N. T., Soylu, Ş., Güç, F., & Ögrenci, A. S. (2022, September). MuscleNET: Smart Predictive Analysis for Muscular Activity Using Wearable Sensors. In 2022 Innovations in Intelligent Systems and Applications Conference (ASYU) (pp. 1-6). IEEE.