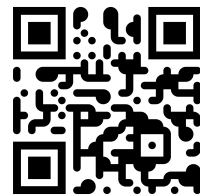


Ethan Matzek

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EDUCATION

WRIGHT STATE UNIVERSITY

PHD IN COMPUTER SCIENCE

Anticipated May 2028 | Dayton, OH

CLARKSON UNIVERSITY

BS IN COMPUTER SCIENCE

Dec 2023 | Potsdam, NY

College of Science

With Great Distinction

Cum. GPA: 3.79 / 4.0

SKILLS

PROGRAMMING

- Python
- C++
- C#
- Java
- C
- Javascript
- MATLAB
- reStructuredText
- HTML
- \LaTeX
- CSS
- Haskell
- Assembly

OTHER

- Unity
- Visual Studio
- Keras
- React
- Sphinx
- IntelliJ IDEA

LINKS

Github:// [ecmatz](#)

LinkedIn:// [Ethan Matzek](#)

Tutorials:// [VR Sensor Integration](#)

COURSEWORK

Deep Learning

Advanced Computer Vision

Computer Vision

Computer Graphics

Distributed Computing

Multimodal Systems

Human-Computer Interaction

RESEARCH

TERASCALE ALL-SENSING RESEARCH LAB (TARS) | RESEARCHER

May 2023 – Present | Dayton, OH & Potsdam, NY

Jointly advised by Dr. Sean Banerjee and Dr. Natasha Banerjee. My research uses VR as a platform to improve the well being of individuals, such as reducing hand injuries in musicians or incentivizing healthy living through exergaming.

Using VR to reduce repetitive strain injuries (RSIs): as part of my PhD thesis project, I am developing learning-based algorithms and VR interfaces that provide expert-guided feedback so that pianists can learn proper playing form to reduce RSIs caused by improper playing style.

- Designed a multimodal sensing space consisting of color and depth cameras to capture the movement of the pianist. Used Google MediaPipe to extract hand keypoints for correct and incorrect playing form for major and minor scales.
- Developed a VR application, VRmonic [1], that allows a user to playback pieces and overlay correct playing form. Provided tools, such as tolerance sliders, to guide rigor of feedback provided. Demo paper accepted to the 2024 IEEE International Conference on Artificial Intelligence & extended and Virtual Reality (AIxVR) in Los Angeles, CA.

VR Sensor Integration: as part of TARS goal of enabling broader access to scientific knowledge, I created an open-source tutorial and accompanying GitHub Pages website consisting of 6 modules that walks readers through the process of integrating wearable physiological sensors in VR.

- Led a team of 7 undergraduate students to develop content for integrating physiological sensors, such as sEMG, heartrate, muscle oxygen, and oxygen volume, with VR using the Delsys Trigno Link.
- Tutorials presented at the Indraprastha Institute of Information Technology, Delhi, Indian Institute of Science, Bengaluru, and City, University of London.
- Met with collaborators at Delsys to perform testing and debugging of the code and ensure that material was accessible to a broad group of users.

VR Exergaming: as part of my research on incentivizing healthy behavior using VR, I developed a VR application that enables the user to actively engage in solving a maze by controlling their character using muscle movement and heart rate.

- Developed an VR maze application that enables player control using physiological signals obtained through a heartrate and sEMG sensor.
- In collaboration with Delsys, hosted a demo at IEEE CVPR 2024 in Seattle, WA and discussed with attendees the research on using exergaming for improving health outcomes and the technical details of VR integration.

PRESENTATIONS AND DEMOS

2024 IEEE RO-MAN in Pasadena, CA: Demoed robot/sEMG integration

2024 IEEE CVPR in Seattle, WA: Demoed VR/sEMG integration

2024 IEEE AIxVR in Los Angeles, CA: Demoed VR application for reducing RSIs

CONFERENCE STUDENT VOLUNTEER

2024 Student Volunteer at IEEE RO-MAN in Pasadena, CA

PUBLICATIONS

- [1] E. Matzek, T. Yankee, O. Kohler, T. Lipke-Perry, N. Banerjee, and S. Banerjee. Vrmonic: A vr piano playing form trainer. In *2024 IEEE International Conference on Artificial Intelligence and eXtended and Virtual Reality (AIxVR)*, 2024.