

Avatar-Based Social-Emotional Simulations

Clint Carlson - Director of Education Technology Innovations
@ Department of Psychiatry – Clint.Carlson@cuanschutz.edu

2024

Information Technology in Academic Medicine Conference
Sponsored by the Group on Information Resources (GIR)

Avatar-Based Social-Emotional Simulations

- Addressing the needs to improve soft-skills and improvising in Public Health conversations.
- The platform is highly customizable, allowing for complex scenarios tailored to specific needs and dynamic needs of diverse audiences.
 - Students, Faculty, Trainees, Social Workers, Parents, Counselors, First Responders
 - You get the idea... avatars are for everyone!



Hi there! My name is Karen. I am an avatar designed to introduce you to the Emotional Avatars being created at the University of Colorado - Anschutz Medical Campus.

2024

Information Technology in Academic Medicine Conference
Sponsored by the Group on Information Resources (GIR)

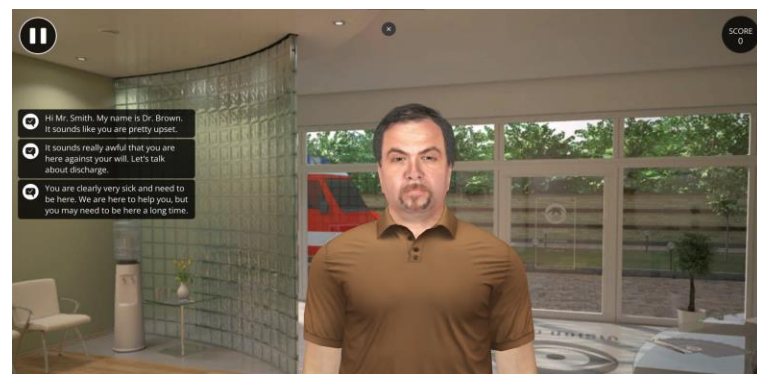
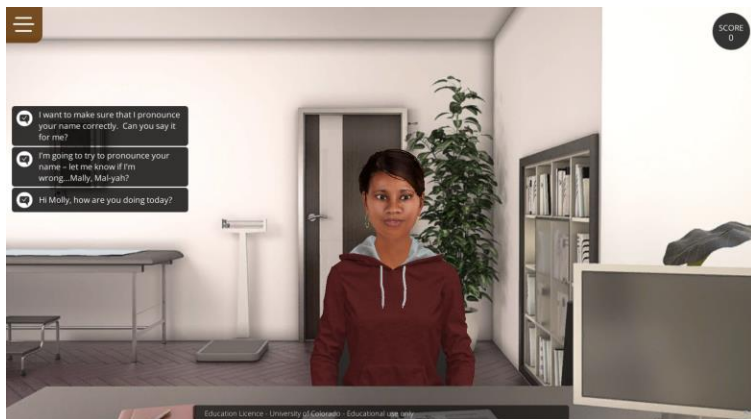
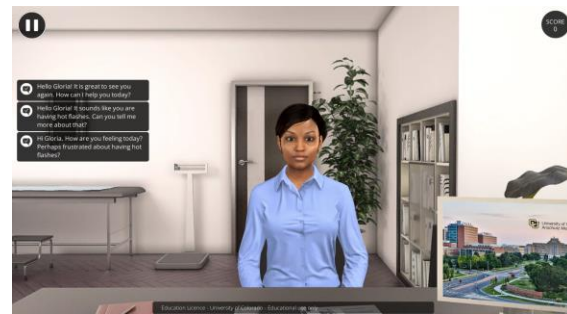
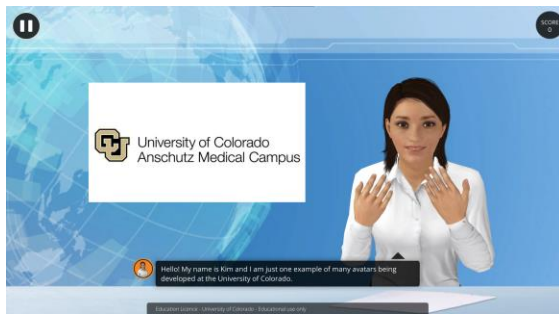
A Safe Space for Experiential Learning

- Enables learners to explore a wide range of non-verbal emotional responses understand the corresponding changes in vocal tone associated with each emotion.
- Reactive verbal and non-verbal communication at each step in the conversation
 - What is said
 - How it is said (tone of voice)
 - Facial Expressions and Body Postures



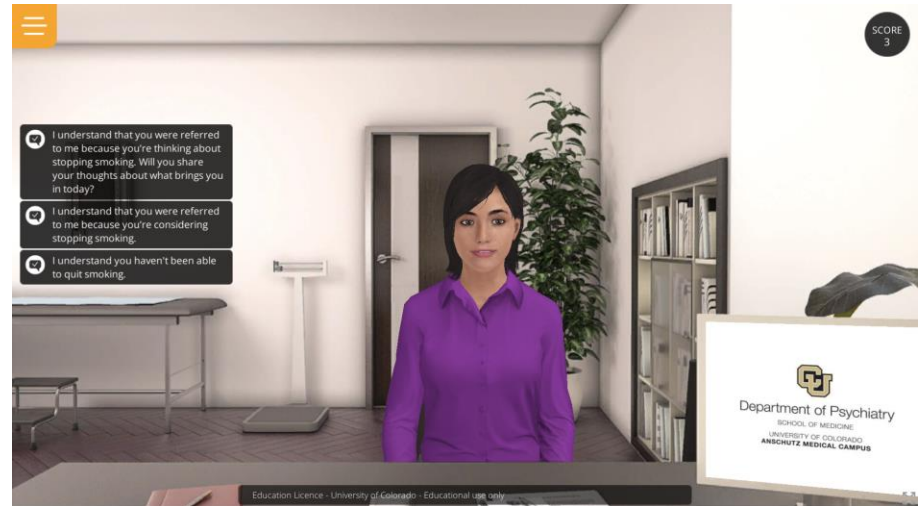
2024

Information Technology in Academic Medicine Conference
Sponsored by the Group on Information Resources (GIR)



2024 Information Technology in Academic Medicine Conference

Sponsored by the Group on Information Resources (GIR)



2024 Information Technology in Academic Medicine Conference
Sponsored by the Group on Information Resources (GIR)

Avatar Portfolio @ xr.cuanschutz.edu

2024

Information Technology in Academic Medicine Conference
Sponsored by the Group on Information Resources (GIR)

Examples

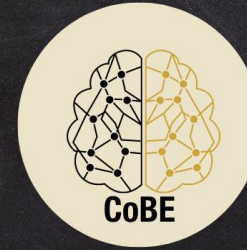
Colorado Bipolar Education Project

<https://xr.cuanschutz.edu/bipolarmasterclass/>



2024

Information Technology in Academic Medicine Conference
Sponsored by the Group on Information Resources (GIR)



Examples

Motivational Interviewing w/Behavioral Health & Wellness Program

<https://xr.cuanschutz.edu/mi/engaging/>



2024

Information Technology in Academic Medicine Conference
Sponsored by the Group on Information Resources (GIR)

Examples

De-escalation Techniques
w/Behavioral Health Services, Denver
Health

- <https://xr.cuanschutz.edu/deescalation/>



2024

Information Technology in Academic Medicine Conference
Sponsored by the Group on Information Resources (GIR)

Examples

Menopause Equity

<https://xr.cuanschutz.edu/echo/>



2024

Information Technology in Academic Medicine Conference
Sponsored by the Group on Information Resources (GIR)

Meeting Learners Where They Are

Standardization

Unlimited learners can run through the same/various simulation(s) unlimited times

Gamification allows learners to "fail upwards" as they learn what happens when taking a wrong turn on purpose.

- **Assessment**

- From full VR to basic web pages access
- Fully remote
- Fully repeatable
- Easy logistical advantages over
 - Actors differing each time
 - Difficult to schedule
 - Difficult to repeat
 - Difficult to provide feedback & assess

2024

Information Technology in Academic Medicine Conference
Sponsored by the Group on Information Resources (GIR)

Where we are...
Where we are going...

2024

Information Technology in Academic Medicine Conference
Sponsored by the Group on Information Resources (GIR)

Avatars & A.I.

- **Edu Copilots**

- A.I. tutors & dynamic learner profiles connected with progress & data
 - Step by step
 - Full simulation details of each student
 - Multi-simulation details of class as a whole
 - Building of AI cohorts based on collective learning progress
- Big picture learner analytics based on module or larger data sets
- [How AI Could Save \(Not Destroy\) Education | Sal Khan | TED](#)



2024

Information Technology in Academic Medicine Conference
Sponsored by the Group on Information Resources (GIR)

Avatars & A.I.

- **Assessment & Feedback**
 - Standardized simulations for large groups of learners
 - Learner profiles connected with progress & data
 - Each step or big picture
 - Full simulation details of each student
 - Multi-simulation details of class as a whole
 - Building of AI cohorts based on collective learning progress
 - Big picture learner analytics based on module or larger data sets

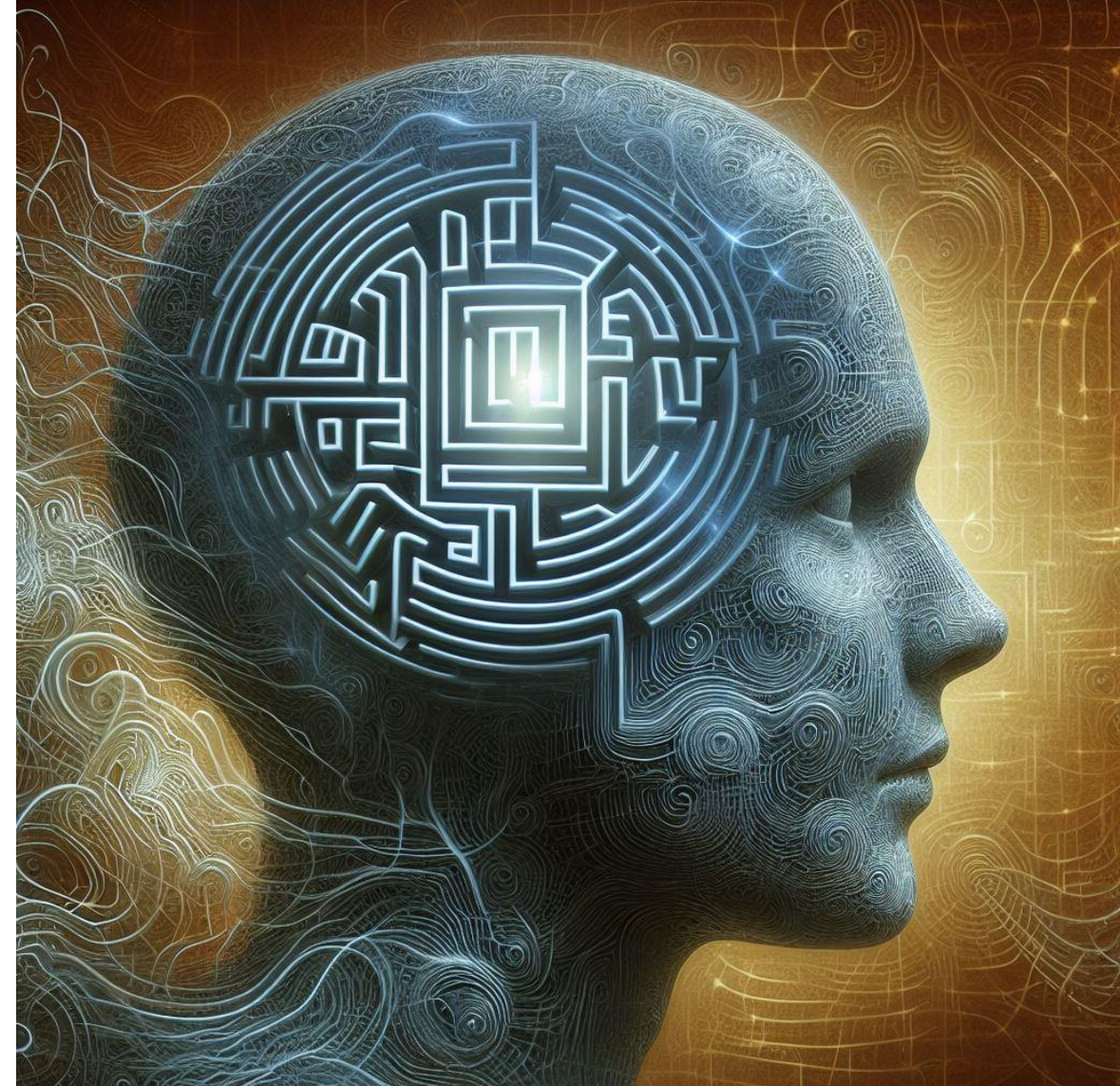


2024

Information Technology in Academic Medicine Conference
Sponsored by the Group on Information Resources (GIR)

Avatars & A.I.

- **LLMs as the "Mind and Personality" behind avatars**
 - Isolating our own LLMs, we can engineer and design AI personas to respond authentically and change over time.
 - Already this being used the manual way by instructing LLMs to generate dynamic branching scripts.



2024

Information Technology in Academic Medicine Conference
Sponsored by the Group on Information Resources (GIR)

Avatars & A.I.

We are already using LLMs to develop the branching script by explain the project and feeding family/medical history into the LLM prompt!

Generate 3 different branching scenario conversations about a Cuban woman named Christina who is approaching menopause. Christina is 45 years old and primarily speaks Spanish. One scenario should be joyful, another upsetting, and a 3rd somewhere in between. Each scenario should have 3 responses of dialog and are aimed at a medical audience.

Sure, here are three branching scenario conversations about a Cuban woman named Christina who is approaching menopause. Each scenario has three responses of dialog and are aimed at a medical audience.

Joyful scenario

- **Doctor:** Christina, I understand that you are approaching menopause. How can I help you today?
- **Christina:** Doctor, I am feeling very well. I have been experiencing some hot flashes and night sweats, but they are not too bothersome. I am mostly concerned about the long-term health risks of menopause, such as osteoporosis and heart disease.
- **Doctor:** I am glad to hear that you are feeling well overall. Menopause is a natural part of life, and most women experience some mild symptoms. However, it is important to be aware of the potential long-term health risks. There are a number of things you can do to reduce your risk of these health problems, such as exercising regularly, eating a healthy diet, and getting enough calcium and vitamin D.
- **Christina:** Thank you for your advice, doctor. I will make sure to do all of those things.
- **Doctor:** Christina, I understand that you are feeling well overall, but you are concerned about the long-term health risks of menopause. I would like to discuss some of the things you can do to reduce your risk of these health problems.
- **Christina:** I would be happy to hear more about that.

2024

Information Technology in Academic Medicine Conference
Sponsored by the Group on Information Resources (GIR)

Avatars & A.I.

- **Enhanced Simulation of Reality**
 - Patients change as circumstances in their lives change
 - Current weather
 - Day/time of the week
 - Upcoming holidays
 - Tax Season
 - Car broken down
 - Oldest child into University
 - Anniversary of traumatic events
 - Conflict between avatars



2024

Information Technology in Academic Medicine Conference
Sponsored by the Group on Information Resources (GIR)

Avatars & A.I.

- **Enhanced Simulation of Reality**
 - Conversation and treatment at 14yo, 16, 19, 22, 35, 55, 70... end of life
 - how does treatment and conversation change over the lifespan?
- Conversation recall
 - Recall past conversations and even wrongly remember the conversation or context (just like humans!)



2024

Information Technology in Academic Medicine Conference
Sponsored by the Group on Information Resources (GIR)

Avatars & A.I.

- **Voice to Text**
 - Allowing us to move from "multiple choice" & "choose your own adventure" models toward speaking naturally.
 - Voice converted to speech for content response
 - Current context
 - Past conversations
 - Vocal analysis for emotion physical reaction
 - Context to understand what physical priorities to apply to the avatars (joy, sad, confusion...)
 - Combined for emotional voices speaking in textual context but also with appropriate emotion.

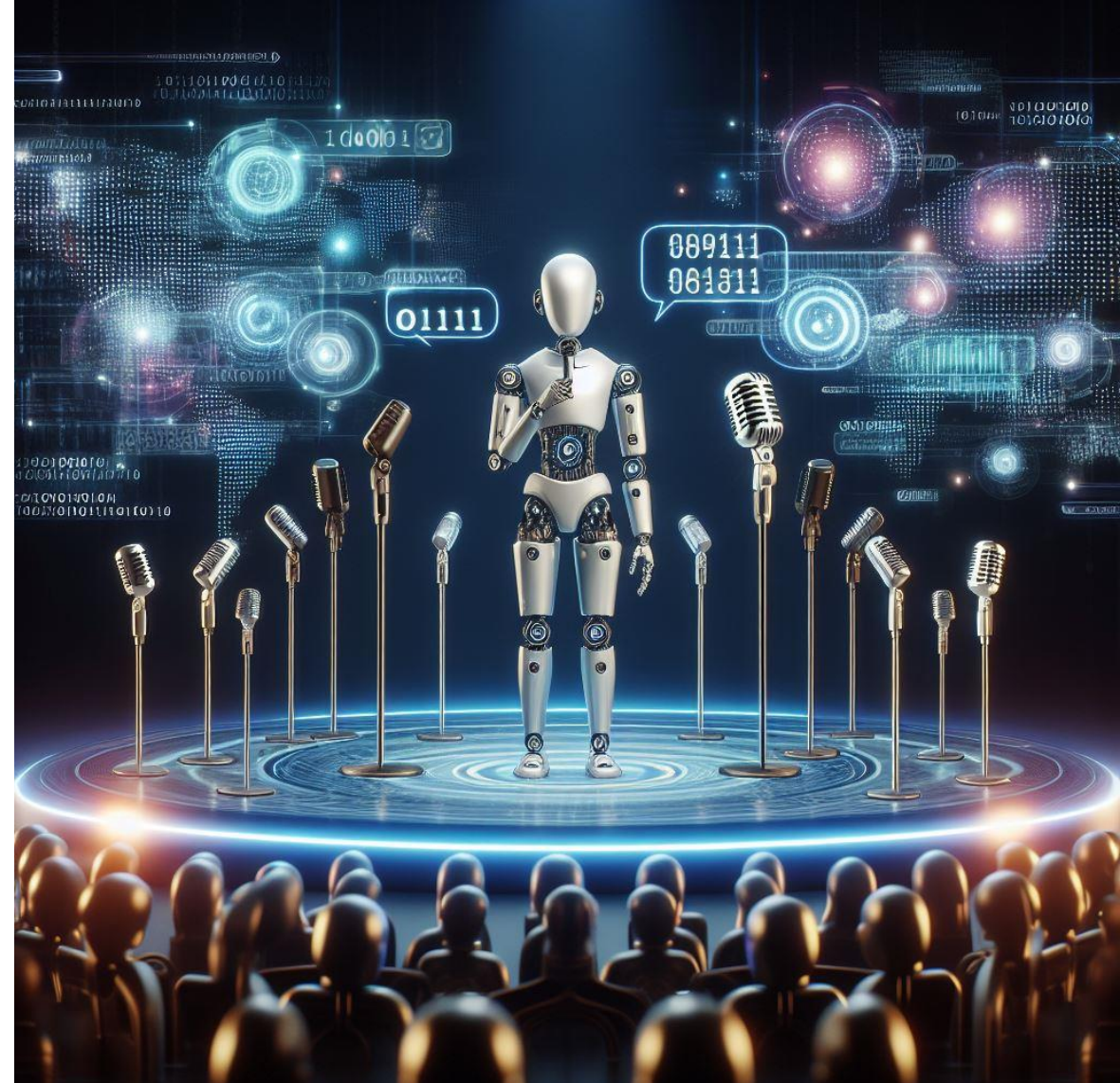


2024

Information Technology in Academic Medicine Conference
Sponsored by the Group on Information Resources (GIR)

Avatars & A.I.

- **AI to Voice Analysis**
 - Voice converted to speech for content response
 - Current context
 - Past conversations
 - Vocal analysis for emotion reception to respond to.



2024

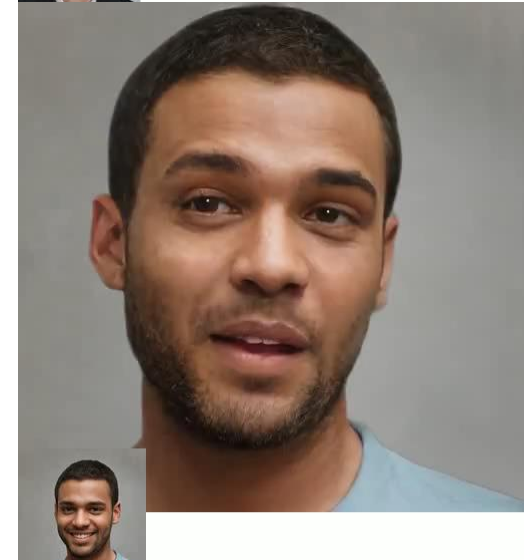
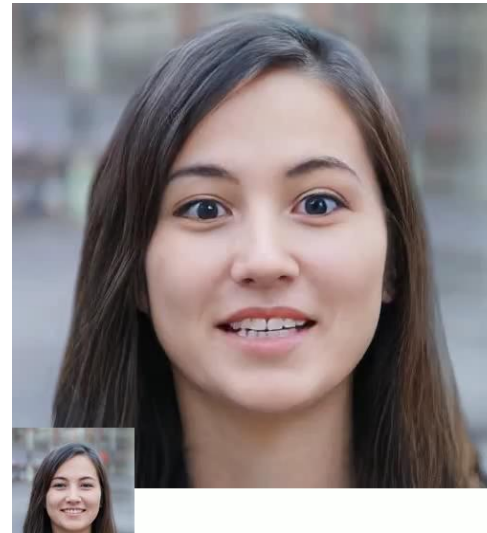
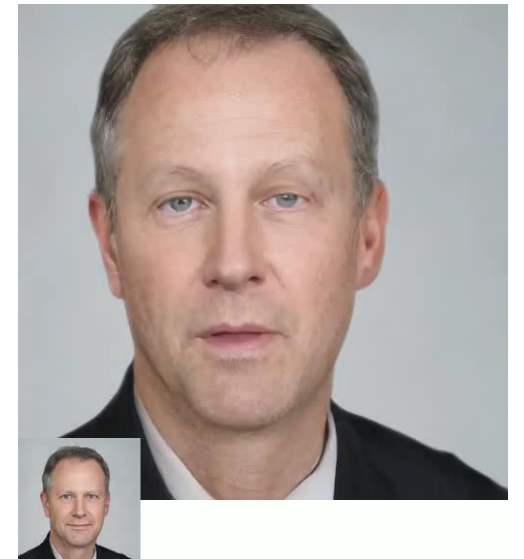
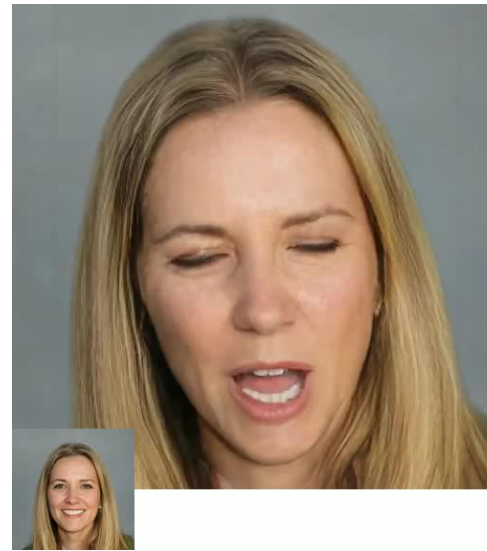
Information Technology in Academic Medicine Conference
Sponsored by the Group on Information Resources (GIR)

Avatars & A.I.

- **Full Avatar Visual Realism**

- Away from the "video game" looking resolution currently, simulations can now be created with very high realism.

- <https://shunsukesaito.github.io/rgca/>
- <https://www.synthesia.io/>
- <https://www.microsoft.com/en-us/research/project/vasa-1/>
- <https://github.com/OpenTalker/SadTalker>



2024

Information Technology in Academic Medicine Conference
Sponsored by the Group on Information Resources (GIR)

Avatars & A.I.

- **Real-World Locations**
 - Avatars may be placed anywhere (GPS in the code) on earth!
 - Allowing for additional realism of timing and the unexpected while placing these simulations in real-world settings.
 - This campus will be full of avatars sitting in various rooms ready to interact.



2024

Information Technology in Academic Medicine Conference
Sponsored by the Group on Information Resources (GIR)

Avatars & A.I.

- **Augmented Reality & Spatial Computing**
 - Wearing a pair of AR hardware, avatars will be in physical spaces with all of us – waiting for learners to enter a room or entering the existing room.
 - Already using AR for Brain models - <https://xr.cuanschutz.edu/ar-brain/>

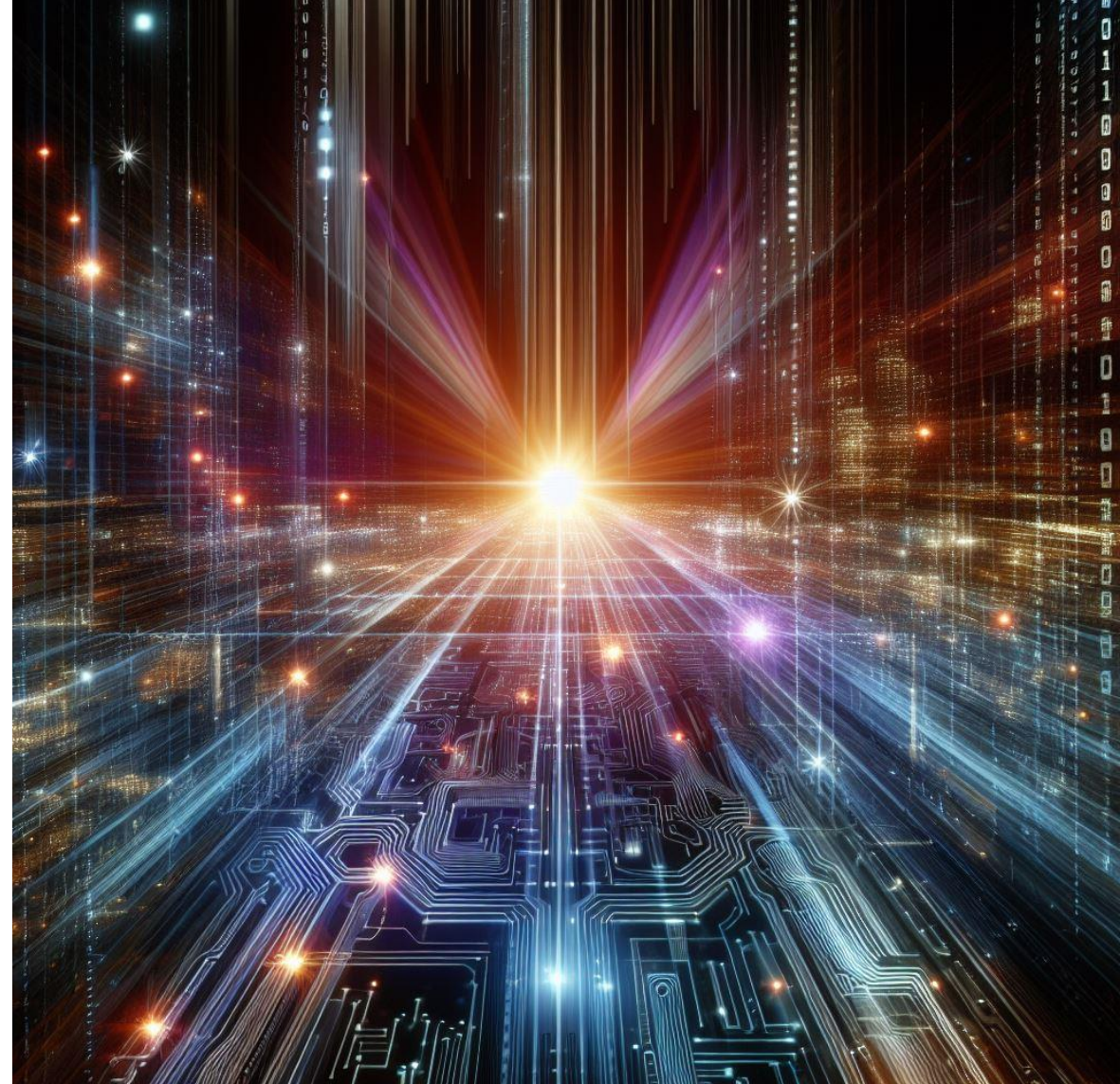


2024

Information Technology in Academic Medicine Conference
Sponsored by the Group on Information Resources (GIR)

Avatars & A.I.

- **What an amazing time to be in EdTech!**
 - Addresses the "scale" problem of educating masses of people with individual support.
 - High experiential learning taking place in real-life physical locations.
 - Personalized towards individual learning preferences, pace, strengths, and weaknesses.
 - Adaptive Assessment in real time.
 - Access to Education for those experiencing barriers (location, cost, resources).
 - Lifelong Learning that offers personalized development and skill-building.



2024

Information Technology in Academic Medicine Conference
Sponsored by the Group on Information Resources (GIR)

Collaboration! Do you have a home for these avatars?

Clint.Carlson@cuanschutz.edu

<https://www.linkedin.com/in/clintcarlson/>

2024

Information Technology in Academic Medicine Conference
Sponsored by the Group on Information Resources (GIR)

Image Sources

- Slides 3-12, Screenshots from Social-Emotional Avatars
- All other images created by Dall-E - <https://designer.microsoft.com/image-creator>
- Slide 21, Other avatar videos - <https://www.microsoft.com/en-us/research/project/vasa-1/>

2024

Information Technology in Academic Medicine Conference
Sponsored by the Group on Information Resources (GIR)

Avatar-Based Social-Emotional Simulations

Clint Carlson - Director of Education Technology Innovations
@ Department of Psychiatry – Clint.Carlson@cuanschutz.edu

2024

Information Technology in Academic Medicine Conference
Sponsored by the Group on Information Resources (GIR)