Welcome to Virtual Reality, CS 498 SL

Prof: Anna Yershova
Office: 2212 Siebel Center, 1-2 pm MW

TAs: Qiuhua Ding, Menglin Tian, Edward Xue, Yixiang Zeng, Craig Santo, Nathaniel Myren, Yihuan Guo, Shantanu Tulshibagwale, Matthew Ong, Rui An, Mike Peretz, Ke Lu, Kewei Sui

Web page: https://courses.engr.illinois.edu/cs498sl3/
Piazza


VR Lab: Siebel Center 4107

No video recordings this semester!

What this class is about: VR, perception meets engineering and computer science.
VR Sales Numbers Are Wet Blanket on Adoption Hopes

This time it’s different, right? Unlike the virtual-reality fad that fizzled 15 years ago, boosters say today’s version of VR tech—backed by the likes of Facebook (FB, -0.79%), Google (GOOGL, -0.68%), and Samsung—is going to be big.

Well, maybe not. Sales figures for 2016 are in, and they’re not exciting: The VR industry shipped 6.5 million devices and pulled in $1.8 billion in revenue, according to research firm Super Data. That’s below expectations, though analysts say it isn’t terrible for an emerging technology.

What’s more telling is who’s buying. Though VR has promise for business, most customers now are gamers. They love it—VR game users reportedly engage in 40 sessions a month on average. But such hard-core fans aside, most people lack a compelling reason to shell out for the gear. Research firm Masic says that...
WHAT IS THE KILLER APP?

HINT: Do not use locomotion in your projects!!!
A BIT ABOUT YOU

Have you tried VR before?

Do you own a VR headset?

Do you like rollercoasters?

Do you get motion sickness?
A Bit About Oculus

• early 2012, Palmer Luckey made a prototype headset (duct taped!)

• Aug 2012, John Carmack improved it and showed at E3.

• Aug 2012, game industry leaders showed strong support, Oculus is founded (Brendan Iribe, Michael Antonov, Nate Mitchell, and Jack McCauley)

• Sep 2012, Kickstarter very successful.

• 2012-2014, over 60,000 headsets sold.

• March 2014, Facebook acquires Oculus for $2 billion.
A Bit About Oculus

https://www.youtube.com/watch?v=pAC5SeNH8jw
What's This Course About?

GOALS:
- Learn how to build a *good* VR experience (comfortable + adequate for task)
- Understand how VR works (engineering + psychology)
- Learn how to criticize VR
- Learn fundamentals to shape future of VR

Lecture: 4/5 MPs, 2 exams, project

TASK-DEPENDENT VR:
- Game
- Write code
- Maintain relationship
- Relax
- Watch film
- Travel to exciting virtual places
Definition of VR

Inducing targeted behavior in an organism by using artificial sensory stimulation, while the organism has little or no awareness of the interference.

Awareness = place cells?
https://www.youtube.com/watch?v=vOJKID4ukbY
Examples of VR

Omni: Real Battlefield Place [ Future of Gaming in the world ]

https://www.youtube.com/watch?v=j3vHv4INvg4
Examples of VR

https://www.youtube.com/watch?v=1DJOTEDBA2c
Examples of VR

https://www.youtube.com/watch?v=1ezL8nGo--l
Inducing targeted behavior in an organism by using artificial sensory stimulation, while the organism has little or no awareness of the interference.

Who is the laboratory rat and who is the scientist?
VR or not VR?

- playing second life (first person video game)  No
- watching a movie  Yes
- video conferencing  No
- listening to the music  No
- playing a third person video game  NS
- AR is VR $ R$
- talking on the phone
- reading a book
- looking at a painting
- being under the influence of a halucinagenic drug  NOT VR
- wearing thermal clothes  NOT VR
Definitely VR

Socializing in Virtual Spaces

Open Sim, Second Life, ...
Do you wish your home were bigger?
Definitely VR

Movies

VR CINEMA
Definitely VR

Panoramas

Pick your favorite street views and have a look around.
Definitely VR

Connect omnidirectional cameras to mobile robots, humanoids, quadrotors

https://www.facebook.com/makeyourfutures/videos/709112912563319/
Definitely VR

First-Person Shooter Games

Team Fortress 2, Valve Inc.
What could you do with an elephant trunk?
Definitely VR

Thrill Seekers

Virtual amusement park rides!
Definitely VR

Ever wonder how Louis XVI must have felt?
Definitely VR
Definitely VR

Flying Like in Your Dreams

Zurich University of the Arts
When Did VR Start? Paintings?

30,000
When Did VR Start?

15...
When Did VR Start?
When Did VR Start? Motion Pictures?

https://www.youtube.com/watch?v=IEqccPhsqgA
Realism vs Simplicity in Cartoons
Realism vs Lower Cost and Portability
How many FPS are enough?

https://www.youtube.com/watch?v=-Qk7ZSXujRo
Evolution of Computer Games
History of VR

Introducing...

Sensorama

The Revolutionary Motion Picture System that takes you into another world with

- 3-D
- WIDE VISION
- MOTION
- COLOR
- STEREO-SOUND
- AROMAS
- WIND
- VIBRATIONS

Sensorama, Inc., 855 Galloway St., Pacific Palisades, Calif. 90272
Tel (213) 459-2162

https://www.youtube.com/watch?v=ISJWZpFIAIQ
Headsets vs Cave
Birds-Eye View: Hardware

Displays:
- Visual:
- Audio:
- Touch:
- Smell? Taste? Vestibular?

Tracking hardware components:
- IMUs:
- Magnetometers:
- Cameras:

Controllers:
- 

Lens:

Computer:
- CPU:
- GPU:
A sensor is a transducer that transforms the physical world energy into a signal.