



Virtual Reality: History

Last years' projects

Table 1

Stizly:	https://simmer.io/@Stizly/cs484-project
Metal:	https://simmer.io/@lanceallred/metal
Spider	simulator: https://leecbryant.com/SpiderSimulator/
Meditation	https://simmer.io/@danielchall25/cs-484-final-project

The first “artificial stimulation”



Not too far away from Reno



10,000 year old petroglyphs at Pyramid lake

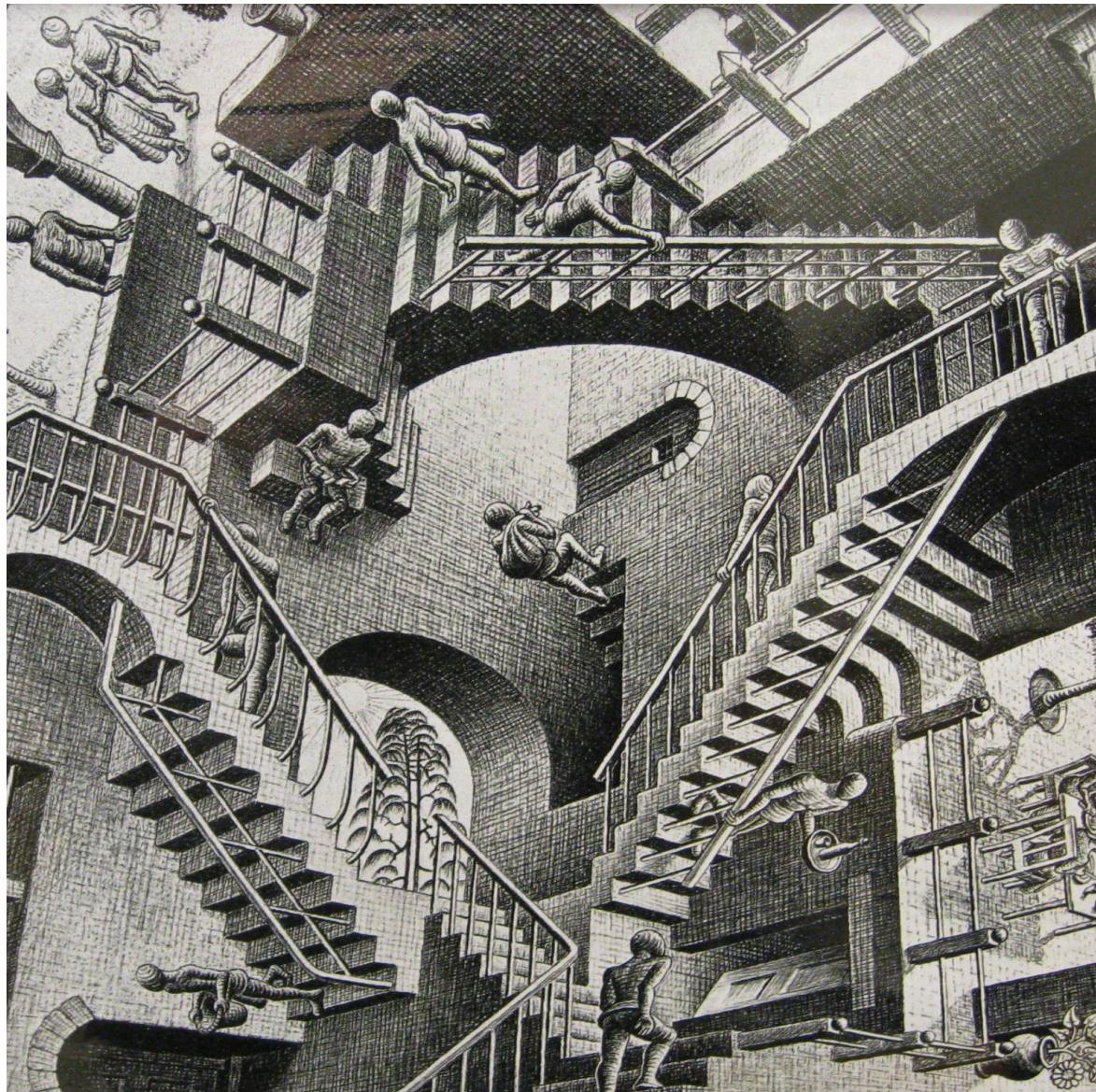
Middle ages, still “primitive”



Renaissance, adding perspective



Adding too much perspective



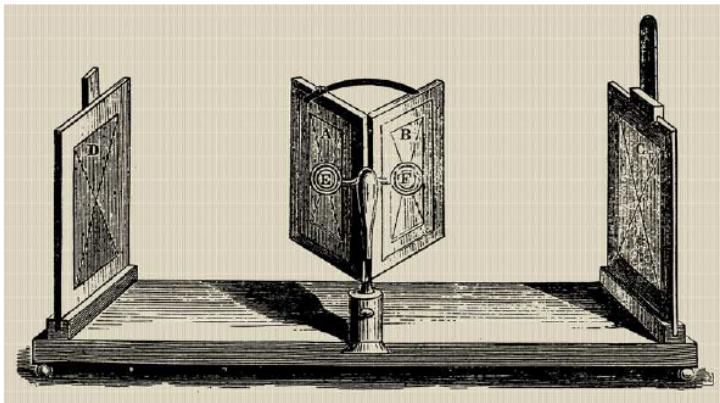
House of stairs
1951 MC Escher

Impressionist, leveraging imagination?



Beyond vanGogh immersive experience coming to Reno in August

Stereoscope, adding depth



1838

Stereopsis ~ the perception of depth and 3D structure obtained on the basis of visual information deriving from two eyes by individuals with normally developed binocular vision.



1930s

Mattel View-Master



1960 -

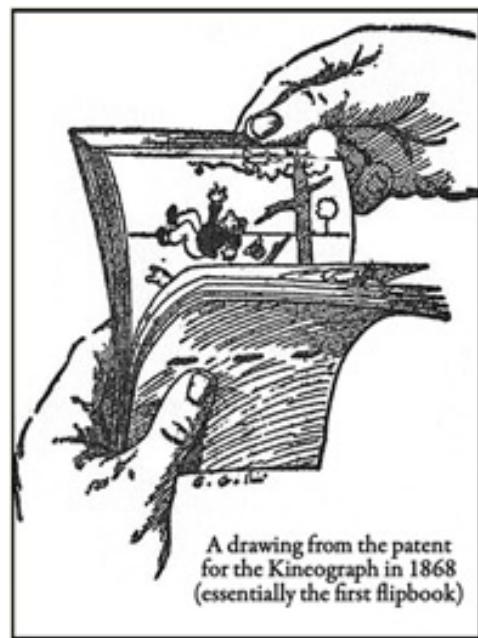


2015

Adding motion



Zoetrope, 1833



Kineograph, 1868

A drawing from the patent
for the Kineograph in 1868
(essentially the first flipbook)

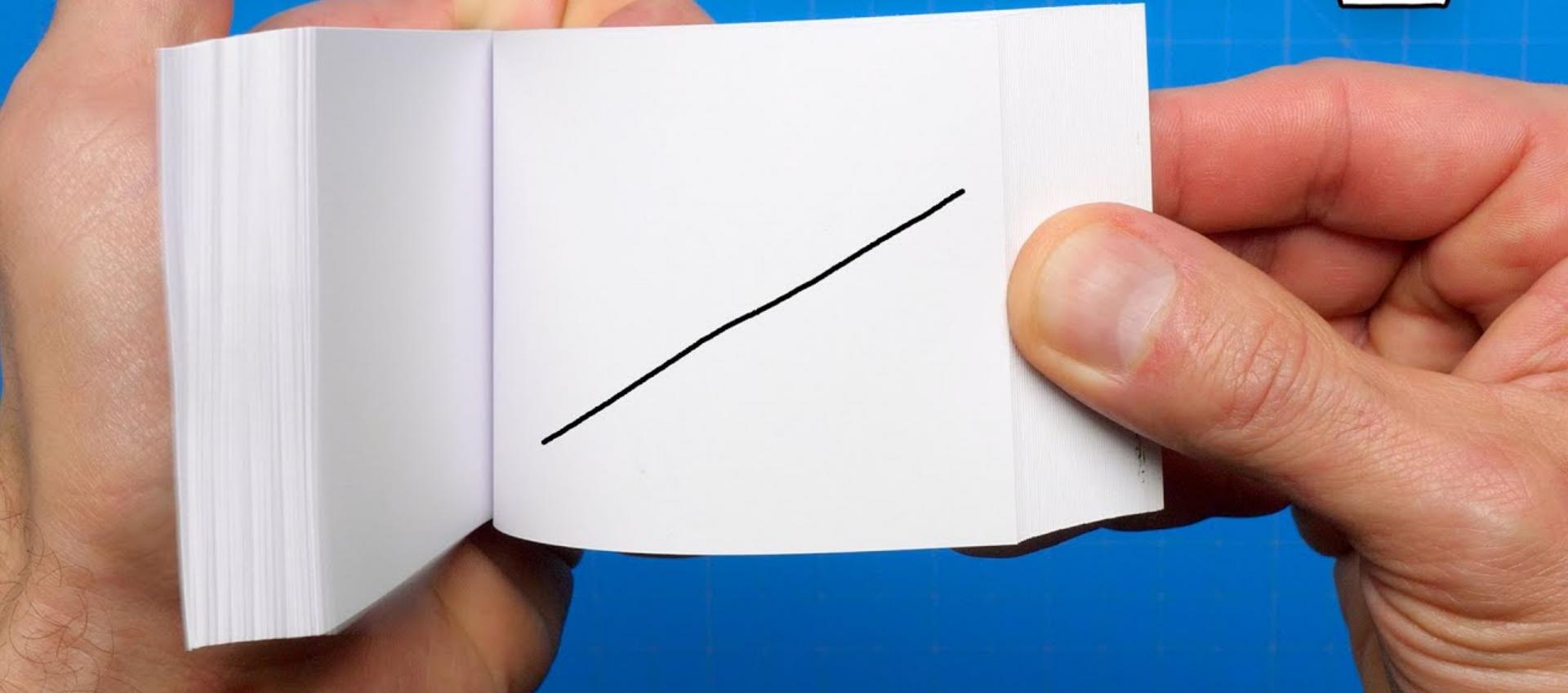
Zoetrope





Kineograph / Flipbook

LINE CHALLENGE 2

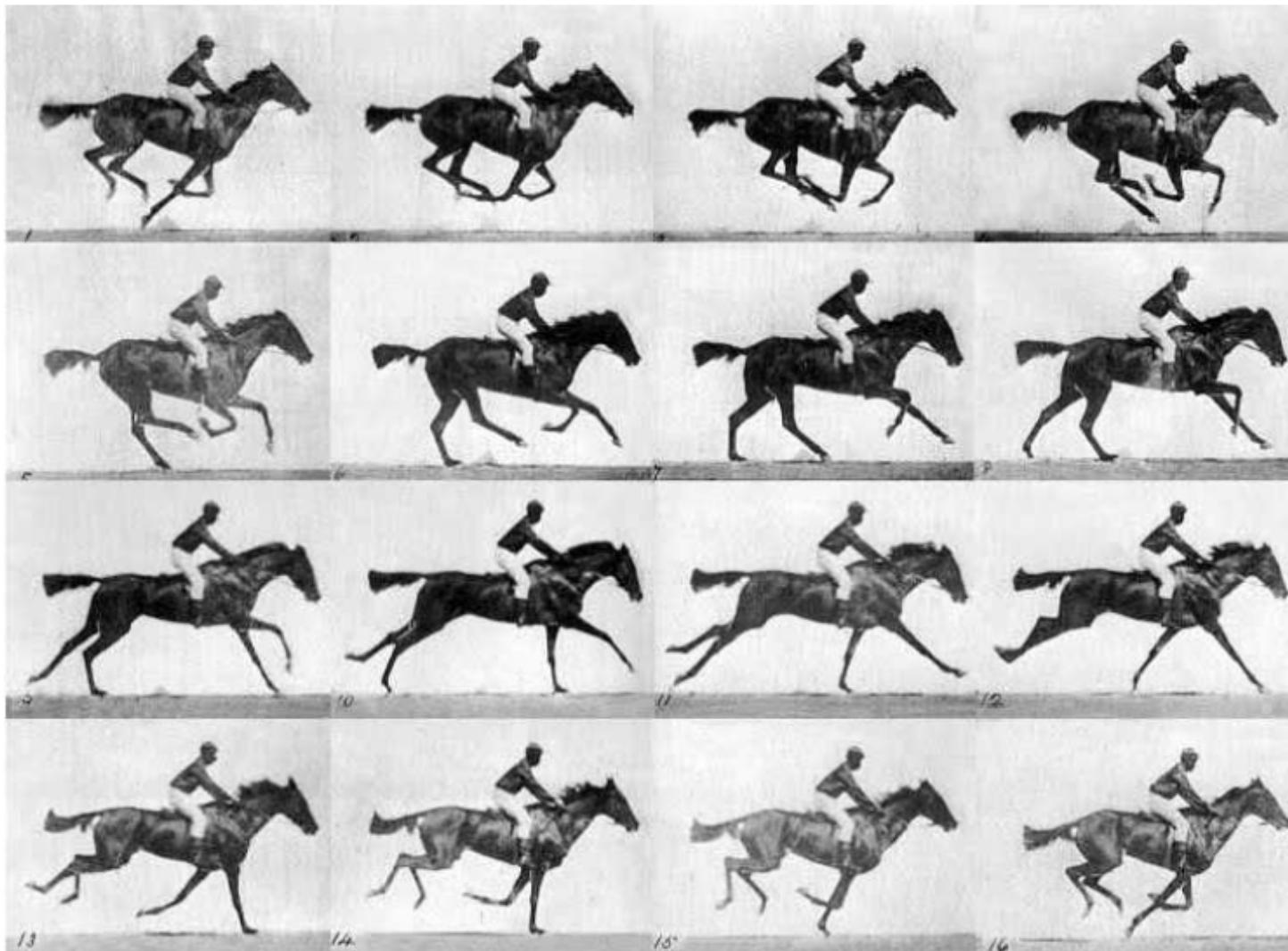




The first “movie”



Horse in motion by EadWeard Muybridge



Film commissioned by Leland Stanford. 12 cameras along a track. Couldn't use flash. Answer whether a horse lifted all four feet from the ground while galloping.

Leap in realism

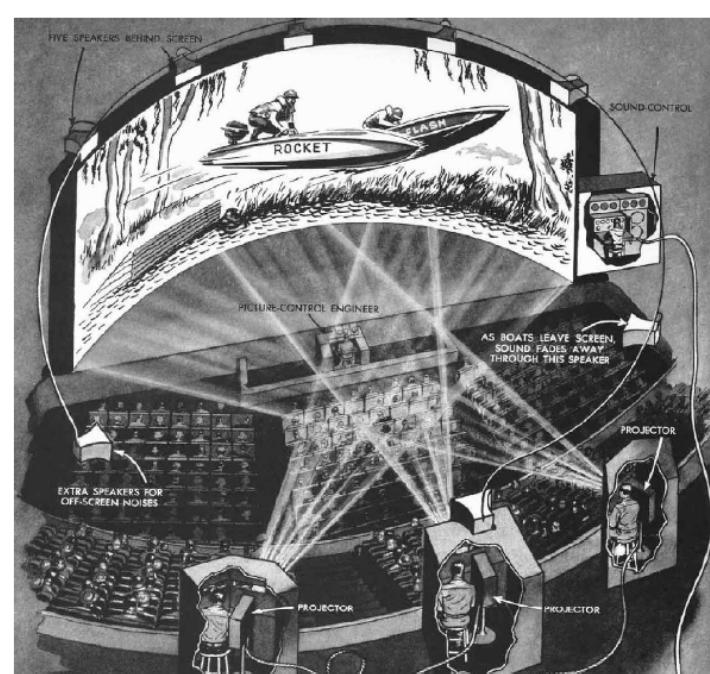


Arrival of a Train at La Ciotat Station - Lumière Brothers

Increasing “immersion”



1957



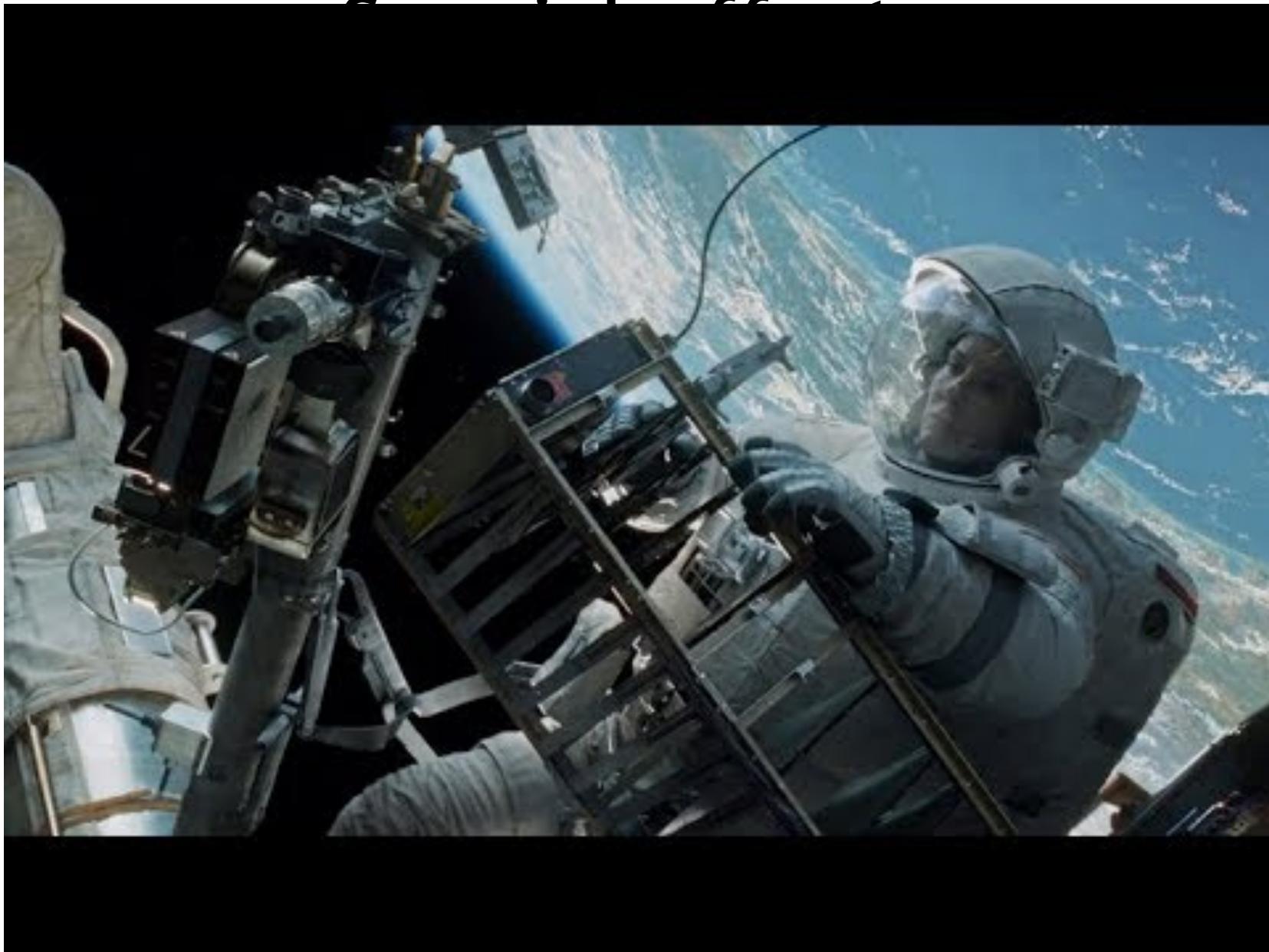
1950s Cinerama

Special Effects



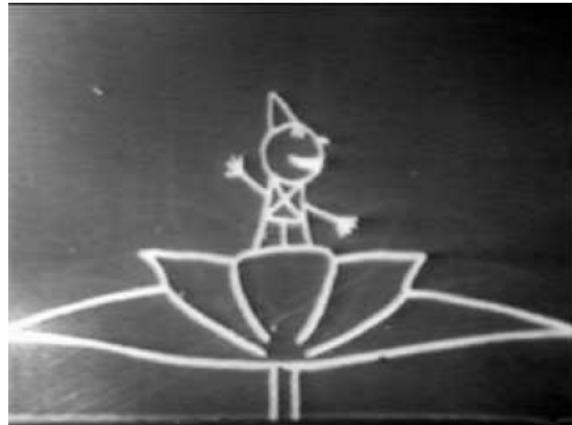
1902 Journey to the Moon - George Melies

Making things look “realistic”

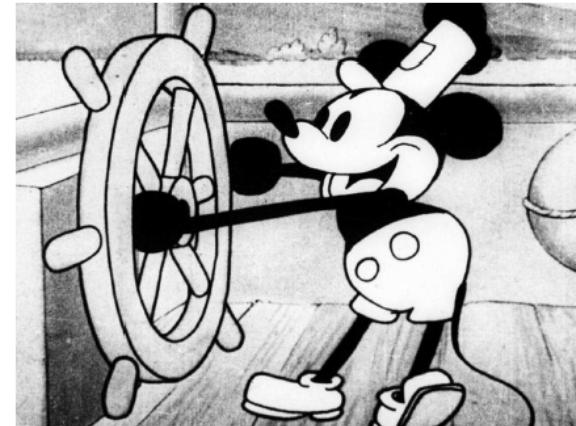


Spacewalks

Realism in Cartoons



(a)



(b)



(c)



(d)

Figure 1.25: A progression of cartoons: (a) Emile Cohl, *Fantasmagorie*, 1908. (b) Mickey Mouse in *Steamboat Willie*, 1928. (c) *The Clone Wars Series*, 2003. (d) *South Park*, 1997.

Uncanny valley



Polar express 2004



Humanoid robot

Uncanny valley is a term used to describe the relationship between the human-like appearance of animated human or robot and the emotional response it evokes.

Avoid the uncanny valley



The incredibles (2004)



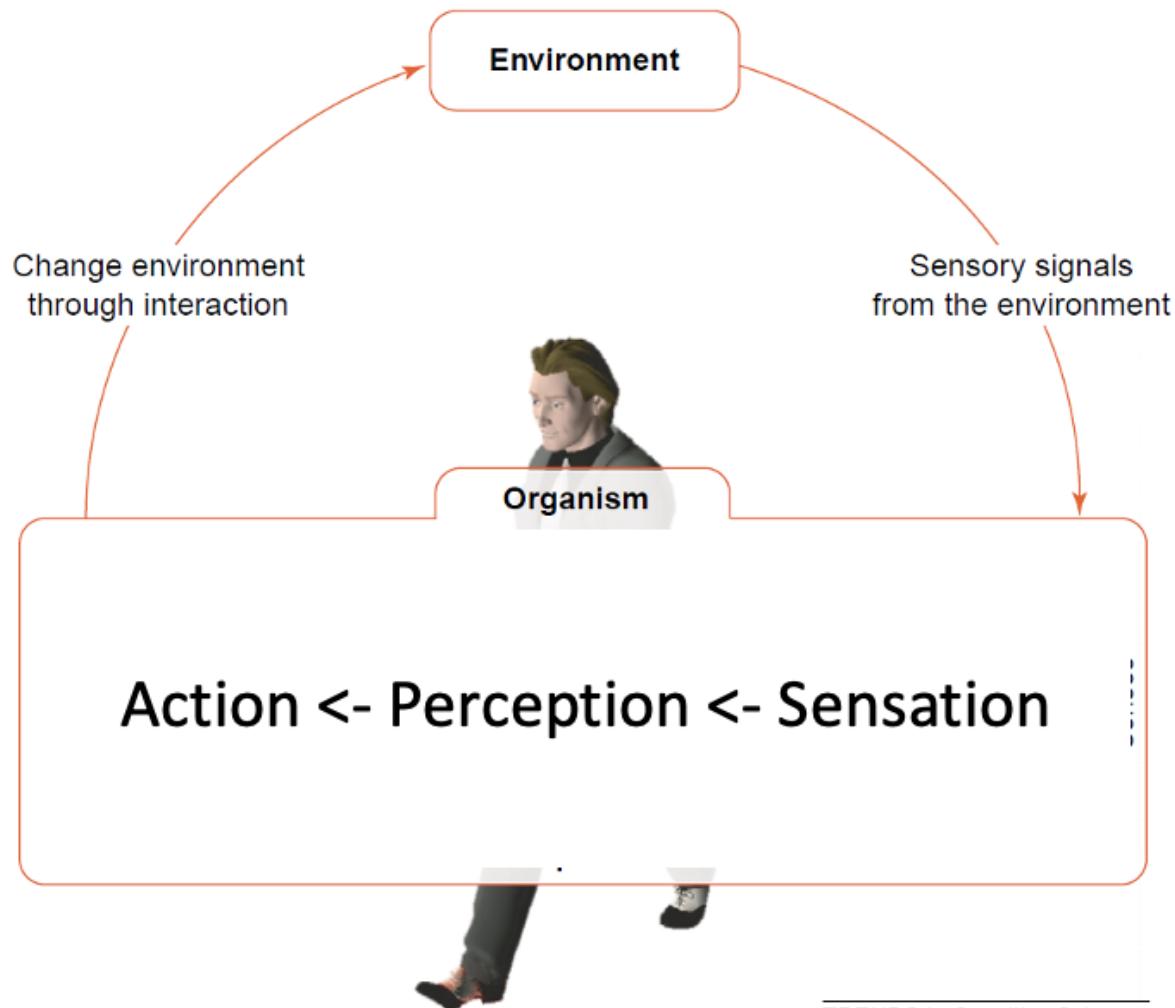
Current Humanoid robots

Adding interaction; video games

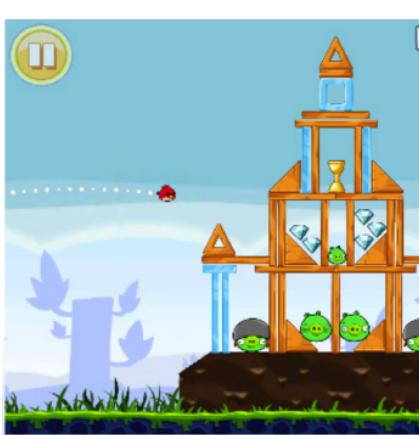


Movies: passive Video games: Active

Open vs closed loop



Abstraction in video games



History of VR

**THE PRECURSOR
TO VIRTUAL REALITY**

THE SENSORAMA

Sensorama 1958

History of VR / AR

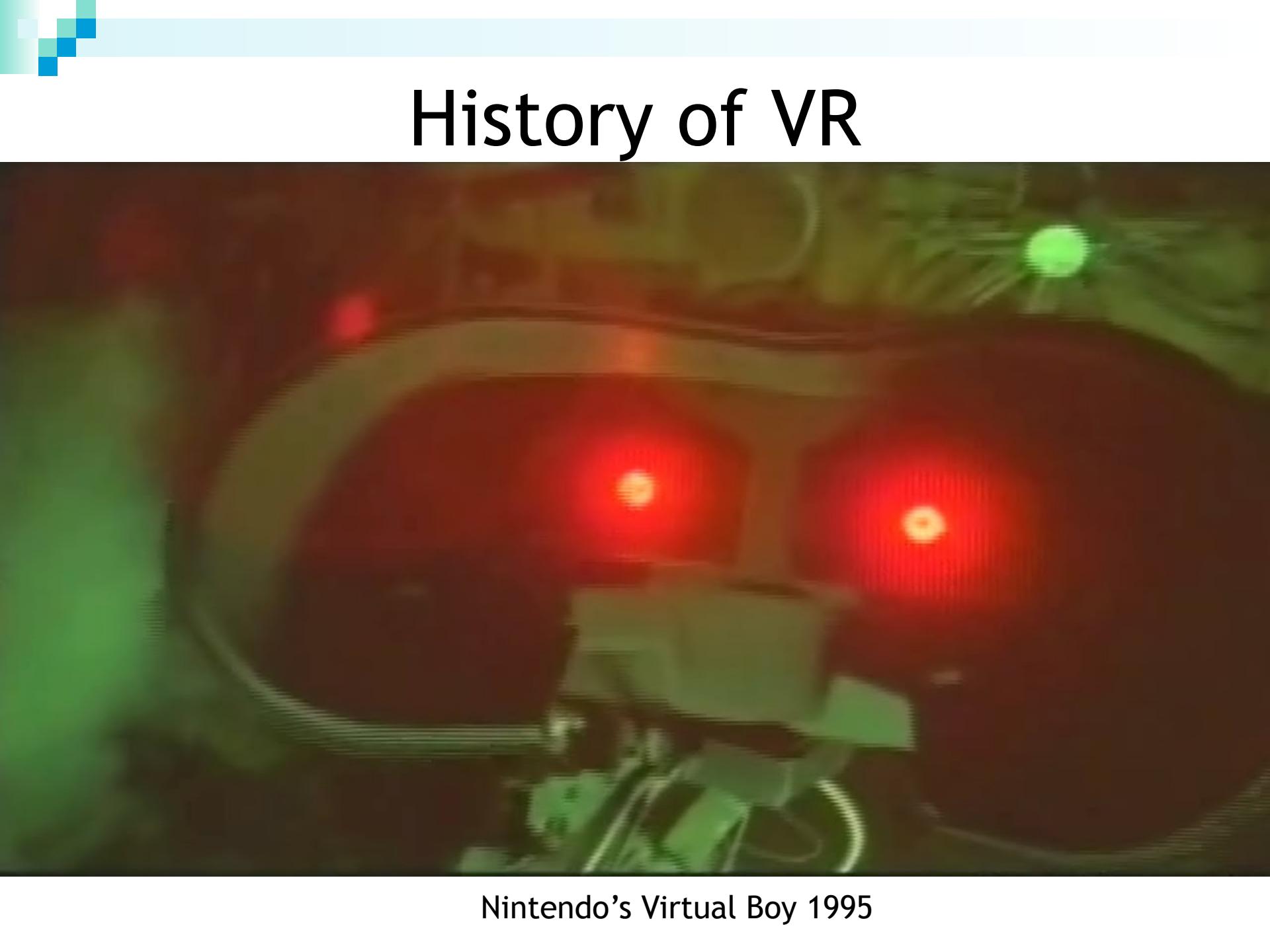


Sword of Damocles 1968
Ivan Sutherland @ Utah

Early VR



5:20



History of VR

Nintendo's Virtual Boy 1995

History of VR



VR in Arcades



Nintendo's Virtual Boy 1995

Headsets - bulky - wired - tethered. Low res. Low frame ate no software

Cave Automatic Virtual Environment



Stereo (using red/blue glasses)
1-6 displays

Cave Automatic Virtual Environment



Dome displays (no stereo)



Vegas: MSG sphere



largest and highest resolution LED screen on Earth.

2014: Oculus DK1



First mass consumer VR headset (kickstarter) that sold for \$300 and sold 60k units

Early consumer VR



Oculus Rift (Facebook)



HTC Vive



Google Cardboard



Sony Playstation VR



Augmented Reality (AR)



Microsoft Hololens



Google Glass

2nd/3rd generation VR headsets



Oculus Quest 2 (Meta)



HTC Vive Focus



Varjo Xr-3



Vive flow



Pimax 8K VR

Current state of the art



Meta Quest 3
2k per eye



Meta quest pro
2k per eye



Varjo Xr-3
2k/3k per eye (peripheral)



Apple Vision Pro
4k per eye

State of the art AR



Microsoft Hololens 2



Magic Leap 2



Meta AR glasses

Snapchat glasses AR



Issues to consider for VR/AR hardware

- COST!
- Weight / comfort / heat
- Tethered / standalone (battery life)
- Resolution / pixels per inch
- Tracking (outside in / inside out)
- Field of view (larger is better)
- Software support (steam VR?)



Social VR

- Challenge /largest opportunity for VR
- Most VR experience are single person
- Human-to-human interaction
- Work / Play together
- Collaboration
- Avatars - be someone else
- Many challenges to solve (VR sickness/ locomotion)

Second life



Social VR



REc room / VR Chat