

The Beauty and Joy of Computing

Lecture #2 : Video Games

Instructor: Sean Morris

CONTROL GAMES WITH THOUGHT!

The Emotiv Epoc sells for \$300 and it comes with an app called EmoKey which allows you to "think" an action and the key will be clicked in the game or program, so you can control anything. (even powerpoint slides?) ☺

emotiv.com



Administrivia

- i>Clickers – we'll be handing out in lab
 - Register your iclicker
 - www.iclicker.com/support/registeryourclicker/
- Turn in your HW0 in tomorrow
- HW1 is turned in online (end of next week)
- Piazza tips
 - Please use Piazza for everything
 - Change your setting to daily digest
 - Search for your answer before posting!



UC Berkeley "The Beauty and Joy of Computing" : Video Games (2)



How big is US video game market?



- a) \$210 million
- b) \$2.1 billion
- c) \$21 billion
- d) \$210 billion
- e) \$2.1 trillion



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software
association



UC Berkeley "The Beauty and Joy of Computing" : Video Games (3)



Video Games : Overview

- History
 - Inventors & Games
- How
 - Design
 - 2D & 3D graphics
 - Motion Capture
 - Artificial Intelligence (AI)
- Good, Bad, Ugly
 - GWAP, RSI, Violence
- Future

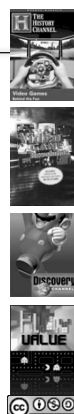


UC Berkeley "The Beauty and Joy of Computing" : Video Games (4)



Documentaries on Video Games

- History: Video Games: Behind the Fun (2000)
 - Available on Netflix
 - PBS: The Video Game Revolution (2004)
 - <http://www.youtube.com/watch?v=jyKb7NOpnvo>
 - Discovery: History of Video Games (2006)
 - <http://hight3ch.com/history-of-video-games-46-mins/>
 - ON Networks : Play Value (2009)
 - <http://blip.tv/play-value>
 - History of Video Games (WWW)
 - en.wikipedia.org/wiki/History_of_video_games
- List of films based on video games# Documentaries on video games**



UC Berkeley "The Beauty and Joy of Computing" : Video Games (5)



The Beginning : Spacewar!

- First to gain recognition
 - Others had games before
 - "Conceived in 1961 by Martin Graetz, **Stephen Russell**, & Wayne Wiitanen"
 - Written for PDP-1 @ MIT
 - Inspired lots, widely ported
- Can still play this!
 - 1 Working PDP-1 ... in CHM
 - Java version available


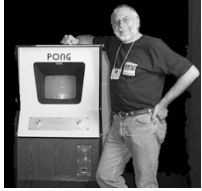




en.wikipedia.org/wiki/Spacewar!
www.computerhistory.org
spacewar.oversigma.com

UC Berkeley "The Beauty and Joy of Computing" : Video Games (6)



The Founding Fathers

- Ralph Baer
 
- Nolan Bushnell
 





blip.tv/play-value
 (also on iTunes in HD 720p)

UC Berkeley "The Beauty and Joy of Computing": Video Games (7)

Shigeru Miyamoto

- The "Walt Disney" of computing gaming
 - Chief Game designer at Nintendo
 - 1st elected to Hall of Fame
- Designed (among others):
 - Donkey Kong
 - Super Mario Bros
 - The Legend of Zelda
 - Super Mario 64
 - Nintendo DS, Wii




blip.tv/play-value/shigeru-miyamoto-4824123
www.time.com/time/asia/2006/heroes/bl_miyamoto.html
en.wikipedia.org/wiki/Shigeru_Miyamoto

UC Berkeley "The Beauty and Joy of Computing": Video Games (8)

Design of a Casual Video Game

- Staff requirements
 - Can be done by one person, ala days of old
 - Bigger teams also (< 10)
 - Lots of new developers
- Phones great platforms
 - iOS dominates field
 - Students are signing up!
- Time to completion
 - Often only a few months!

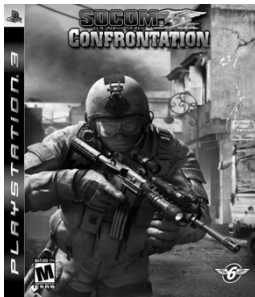


www.apple.com/iphone/from-the-app-store/games.html
blog.entertainment.com/2009/07/7-addicting-casual-games
en.wikipedia.org/wiki/Casual_game

UC Berkeley "The Beauty and Joy of Computing": Video Games (9)

Design of a Core Video Game

- Staff requirements
 - Cross-disciplinary
 - Producer, programmers, game, graphic & sound designers, musicians, testers, ...
 - 100+ person teams
- Similar to film
 - Often, games->film, and film->games
 - Lucasfilm, etc. want to tie assets together




en.wikipedia.org/wiki/Video_games

UC Berkeley "The Beauty and Joy of Computing": Video Games (10)

% of Game Payers who are women

www.theesa.com/facts/gameplayer.asp




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- a) 25%
- b) 35%
- c) 45%
- d) 55%
- e) 65%

UC Berkeley "The Beauty and Joy of Computing": Video Games (11)

How : 3D Computer Graphics

- Similar to making a 3D animated film...
 - Model characters, environment in 3D
 - Add shading + lights + effects + behavior
 - Let 3D rendering engine (on graphics card) do the work of figuring out 2D scene from 3D
- Limitations
 - Many things are too "expensive" to do in 30 frames per second
 - Research breakthroughs!

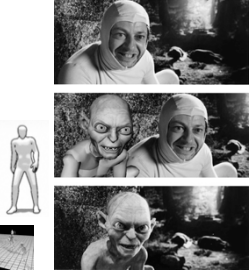


www.nytimes.com/2009/07/08/arts/television/08fight.html
en.wikipedia.org/wiki/Portal:Computer_graphics
www.siggraph.org

UC Berkeley "The Beauty and Joy of Computing": Video Games (12)

How : Motion Capture

- Actors in MoCap suits
- Motions recorded, put in "motion libraries"
 - E.g., running, throwing, passing, tackling
 - Can be edited/cleaned
 - Motion *synthesis* also
- Challenges
 - Motion "blending"
 - Non-"sliding" feet
 - UC Berkeley Research!

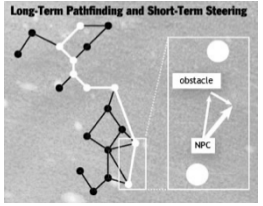


en.wikipedia.org/wiki/Motion_capture
www.phasespace.com

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How : Artificial Intelligence

- Range of intelligence
 - Low: simple heuristics
 - High: Learns from player
- Dynamic difficulty
 - Must hold interest
 - "Simple to learn, difficult to master is the holy grail of game design."
 - Cheating AI (e.g., racing)



www.businessweek.com/innovate/content/aug2008/id20080820_123140.htm
en.wikipedia.org/wiki/Dynamic_game_difficulty_balancing
en.wikipedia.org/wiki/Game_artificial_intelligence
queue.acm.org/detail.cfm?id=971593

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Video Games : Good (Serious Games)

- Education
 - Flight simulations, combat, medical training
 - Classroom
- Games w/a Purpose
 - A game to do useful stuff, hard for computers
 - Luis von Ahn ... gwap
 - ESP: Label images fastest
 - Popvideo: label video
 - Matchin: Gender Guessing
 - DuoLingo: Language

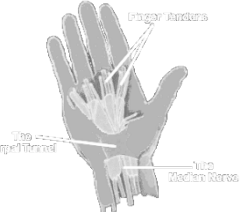


en.wikipedia.org/wiki/Serious_games
en.wikipedia.org/wiki/Game_based_learning
gwap.com

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Video Games : Bad (RSI, addiction)

- Gamers Thumb*
 - Caused with too much use of gamepad
 - I suffered this in 1980s!
 - Solutions?
 - Break timers, rest
- Video game addiction
 - Impulse control disorder
 - Stanford: yes, addictive!
 - "Gamers Wife"
 - Online gamers anon




en.wikipedia.org/wiki/Video_game_addiction
en.wikipedia.org/wiki/Repetitive_strain_injury

UC Berkeley "The Beauty and Joy of Computing": Video Games (16)

Video Games : Ugly (Violence)

- Violent video games
 - Increase aggression, decrease "helping"
 - Others found no link
- High-profile incidents
 - Columbine kids loved the Doom video game
- Ratings help
- Games "folk devil"
 - Billions \$, kids at stake

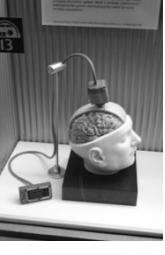


en.wikipedia.org/wiki/Video_game_controversy
www.apa.org/science/psa/sb-anderson.html

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Conclusion : Future of Video Games

- Media producers connecting assets
 - Disney, Lucas big players
- Controllers and sensors expand
- Games on Demand
 - OnLive
- Brain-Computer Interface (BCI)
 - Invasive and Non-
- Education
 - www.pbs.org/kcts/videogamerevolution/impact/future.html
 - en.wikipedia.org/wiki/Brain-computer_interface



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