



# STEP INTO THE FUTURE OF GAMING

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A Practical Approach to Design  
Handheld Augmented Reality Games

Tony Tseng

Artist | Animator | Game Developer | Teacher

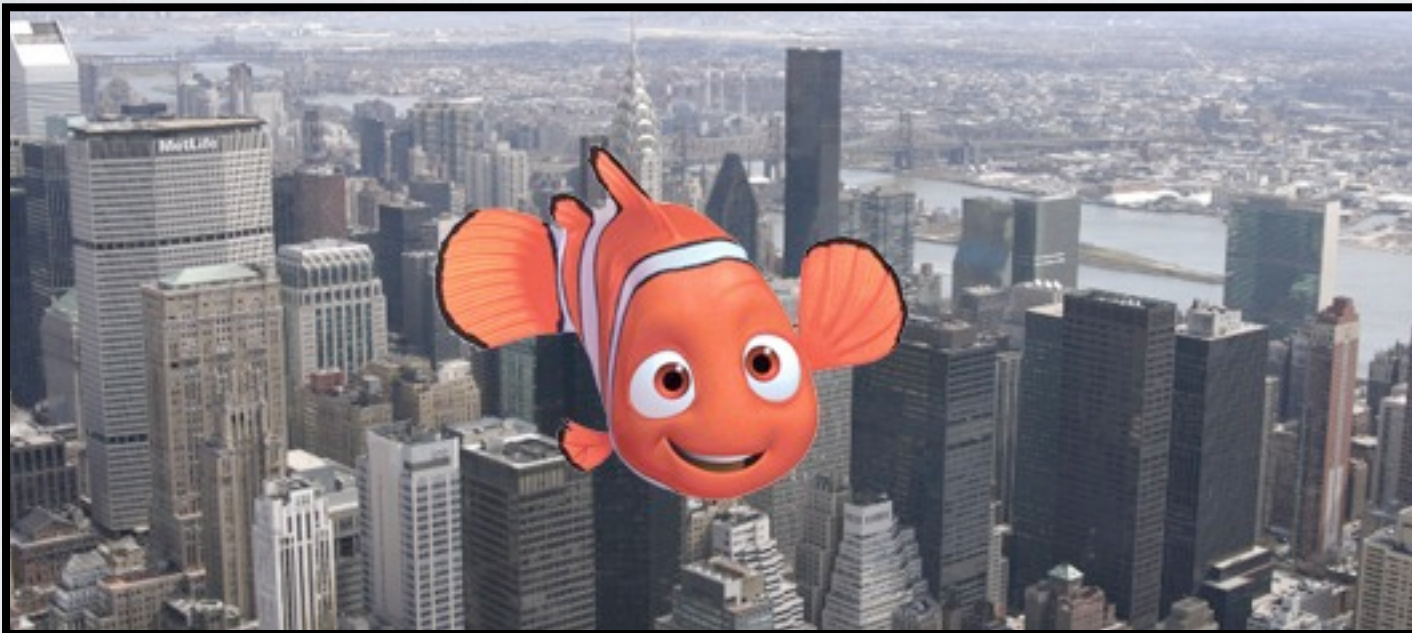
**WHAT IS  
AUGMENTED REALITY**

**?**

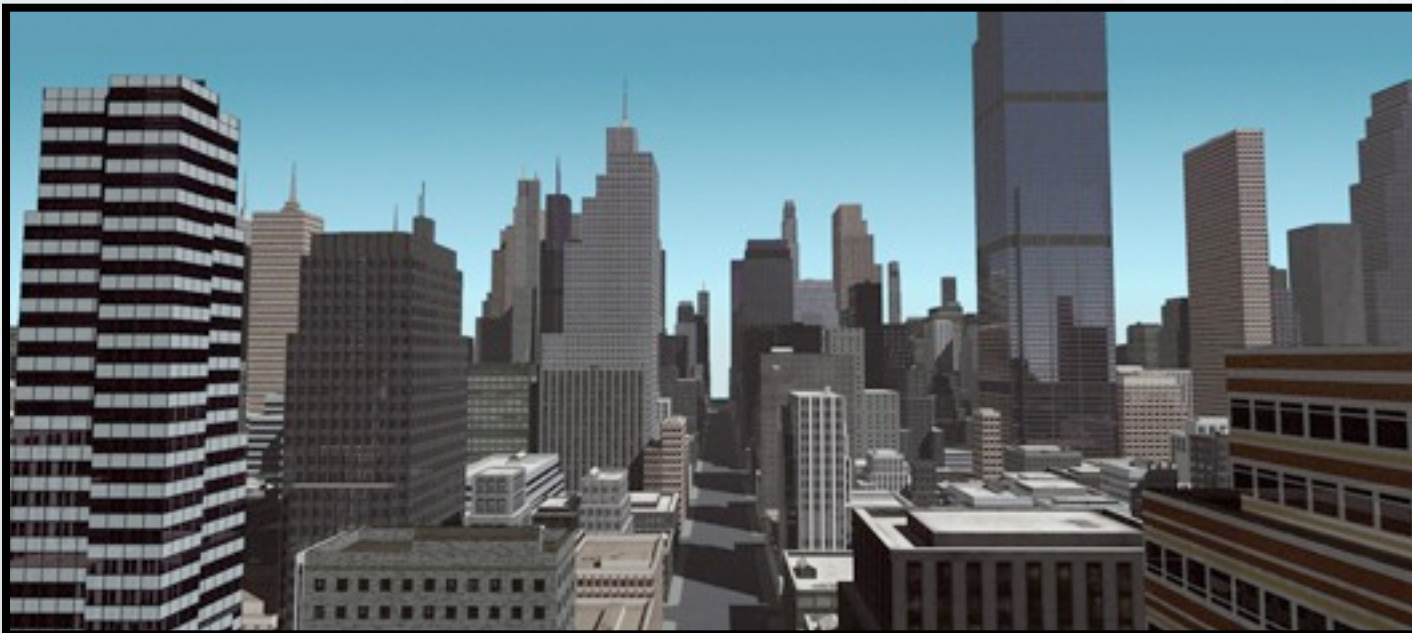




**Reality**

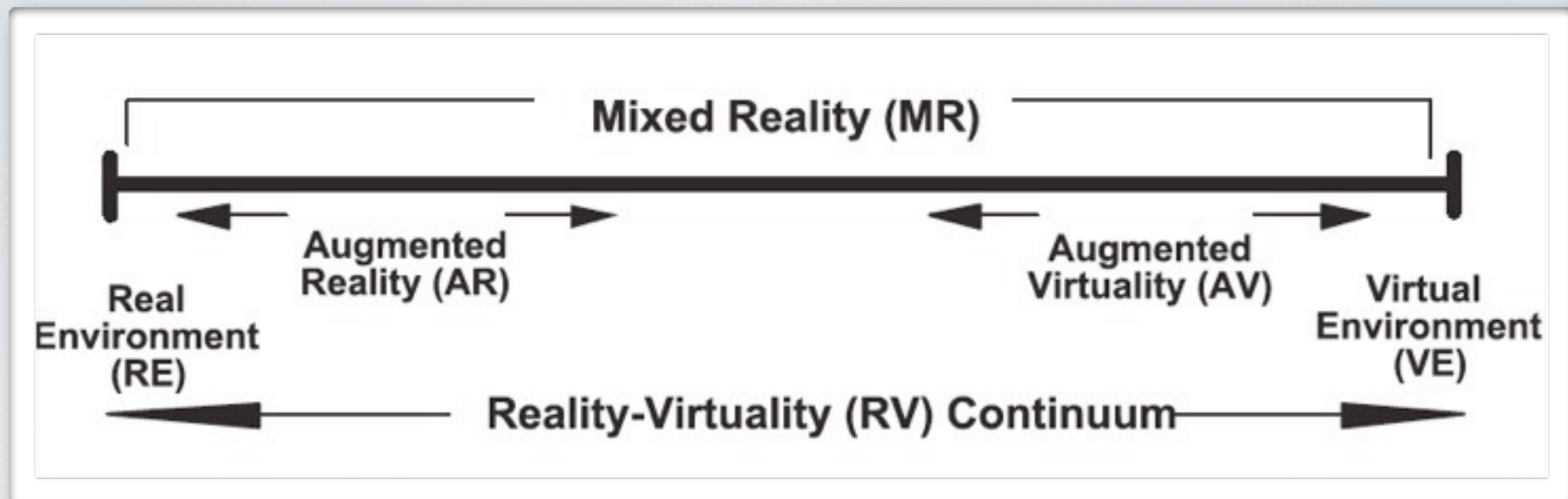


**Augmented Reality**



**Virtual Reality**



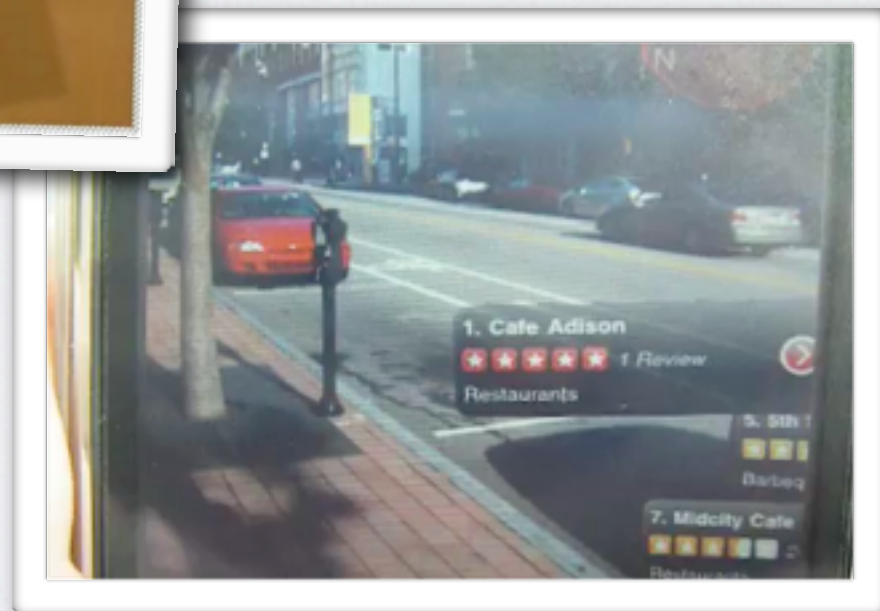
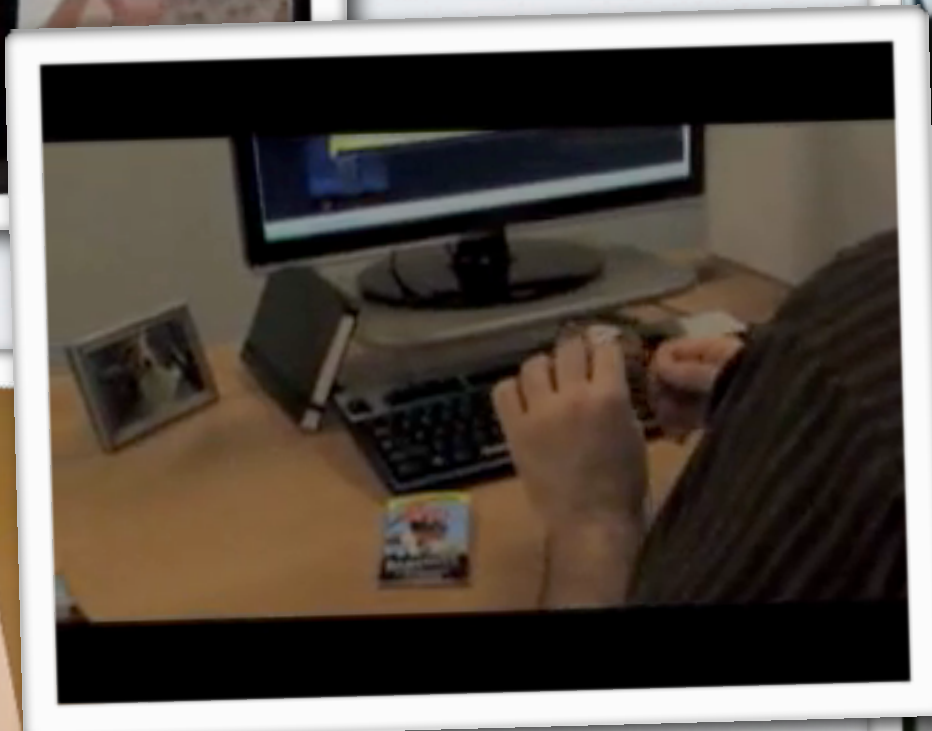
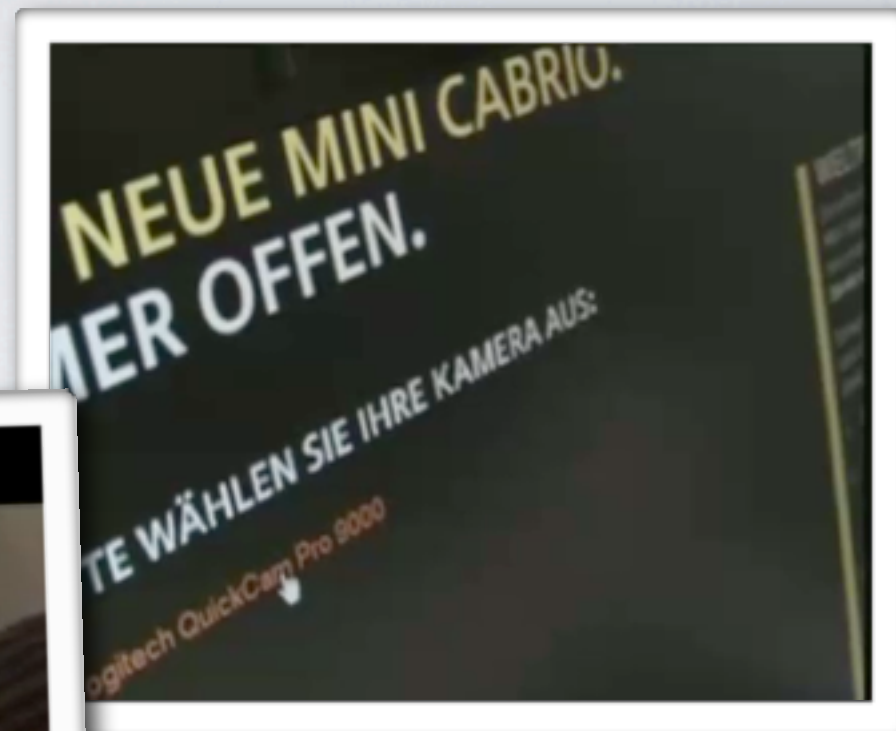


## **Augmented Reality is distinguished by**

- 1) Combining Physical and Virtual World
- 2) Registering the Virtual Content with the Physical World in 3D
- 3) Being Interactive in Real Time



**AUGMENTED REALITY  
ISN'T NEW**

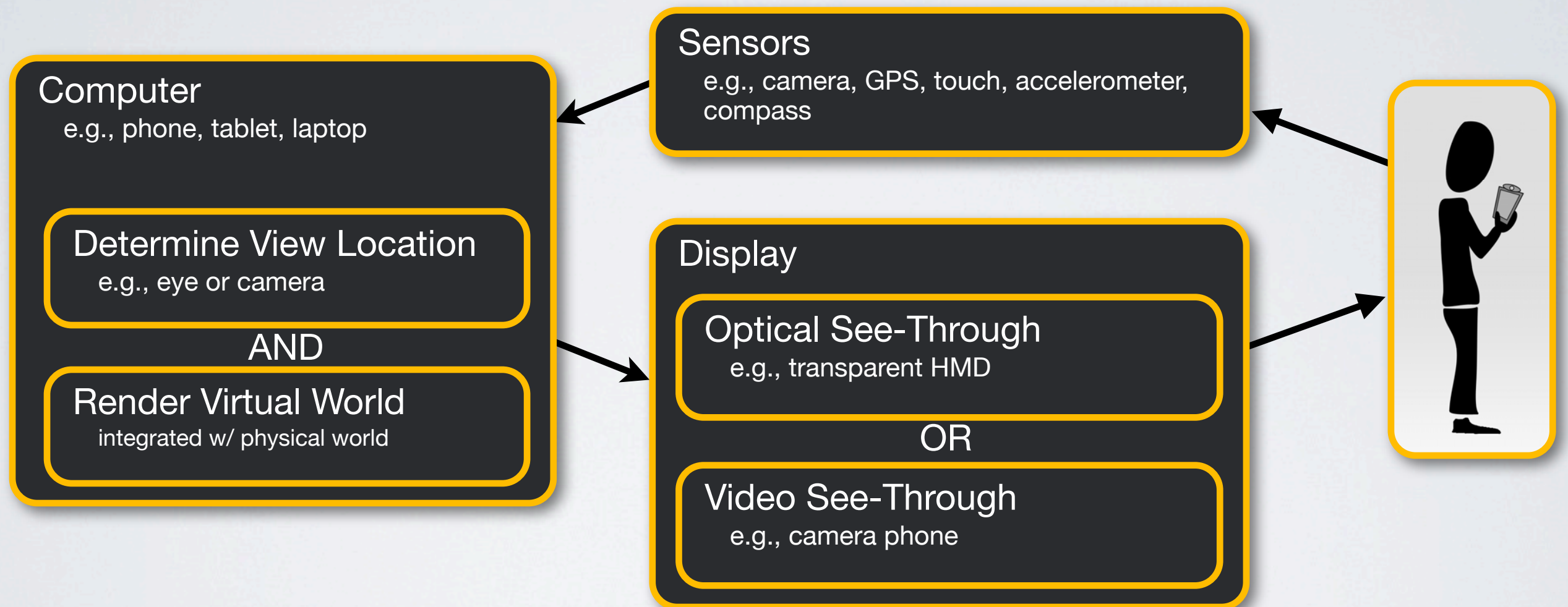




**HOW IS IT DONE**

**?**

# Essential Components of an AR System





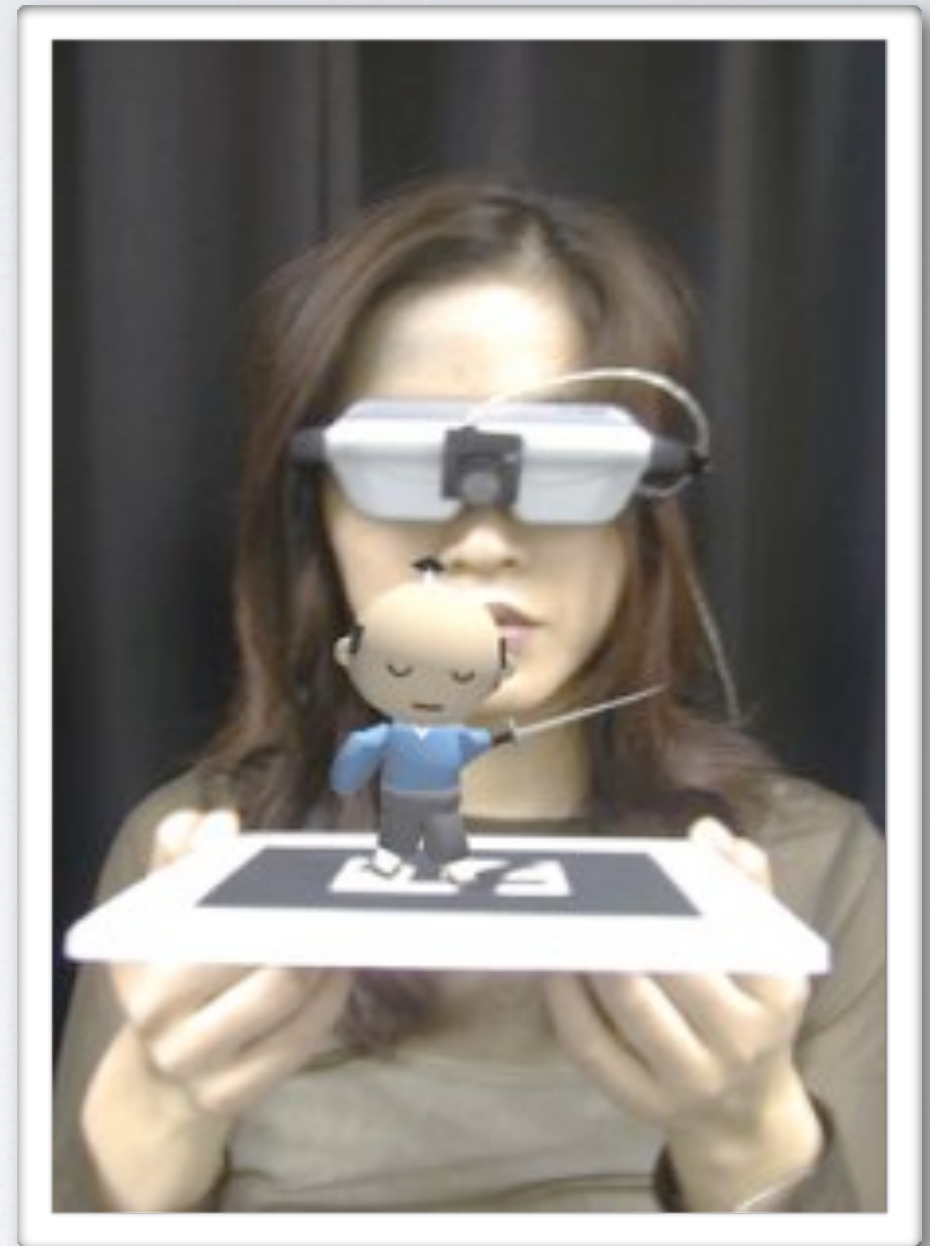
# The 2 Most Important Elements

**TRACKING**

**RENDERING**

# ARTOOLKIT

- Dr. Hirokazu Kato
- Free / Open source
- General Public License (GPL)
- [www.hitl.washington.edu/artoolkit/](http://www.hitl.washington.edu/artoolkit/)





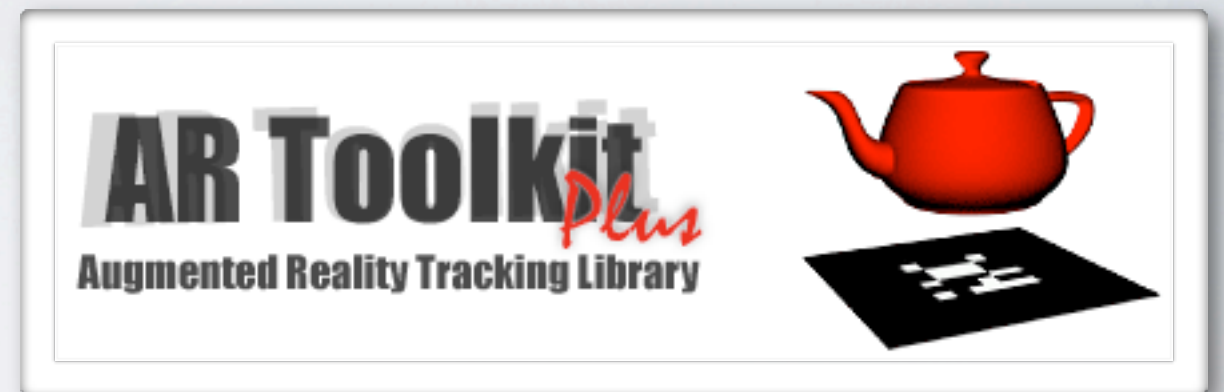
# ARTOOLWORKS

- ARToolworks
- Commercial license
- It has been ported to many authoring environments
- [www.artoolworks.com](http://www.artoolworks.com)



# ARTOOLKITPLUS

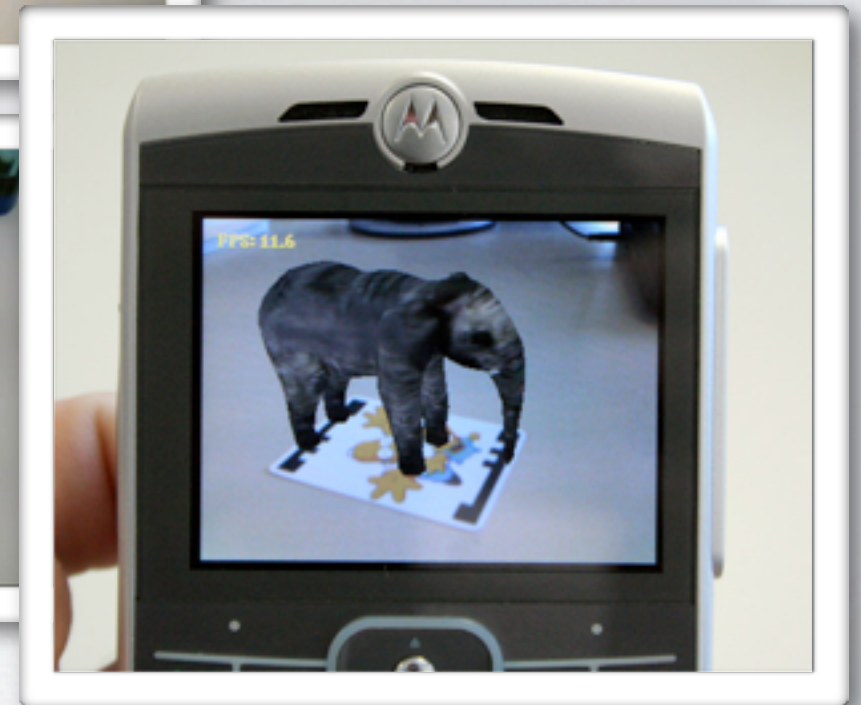
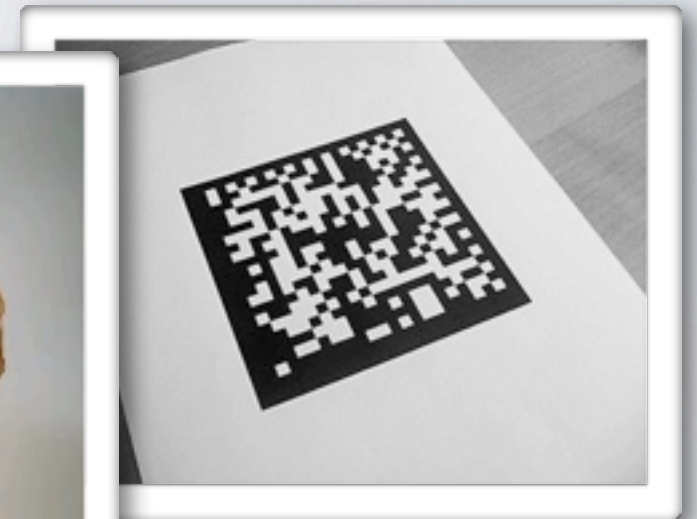
- Graz University of Technology's Christian Doppler Lab
- Free / Open source
- General Public License (GPL)
- [http://studierstube.icg.tu-graz.ac.at/handheld\\_ar/artoolkitplus.php](http://studierstube.icg.tu-graz.ac.at/handheld_ar/artoolkitplus.php)





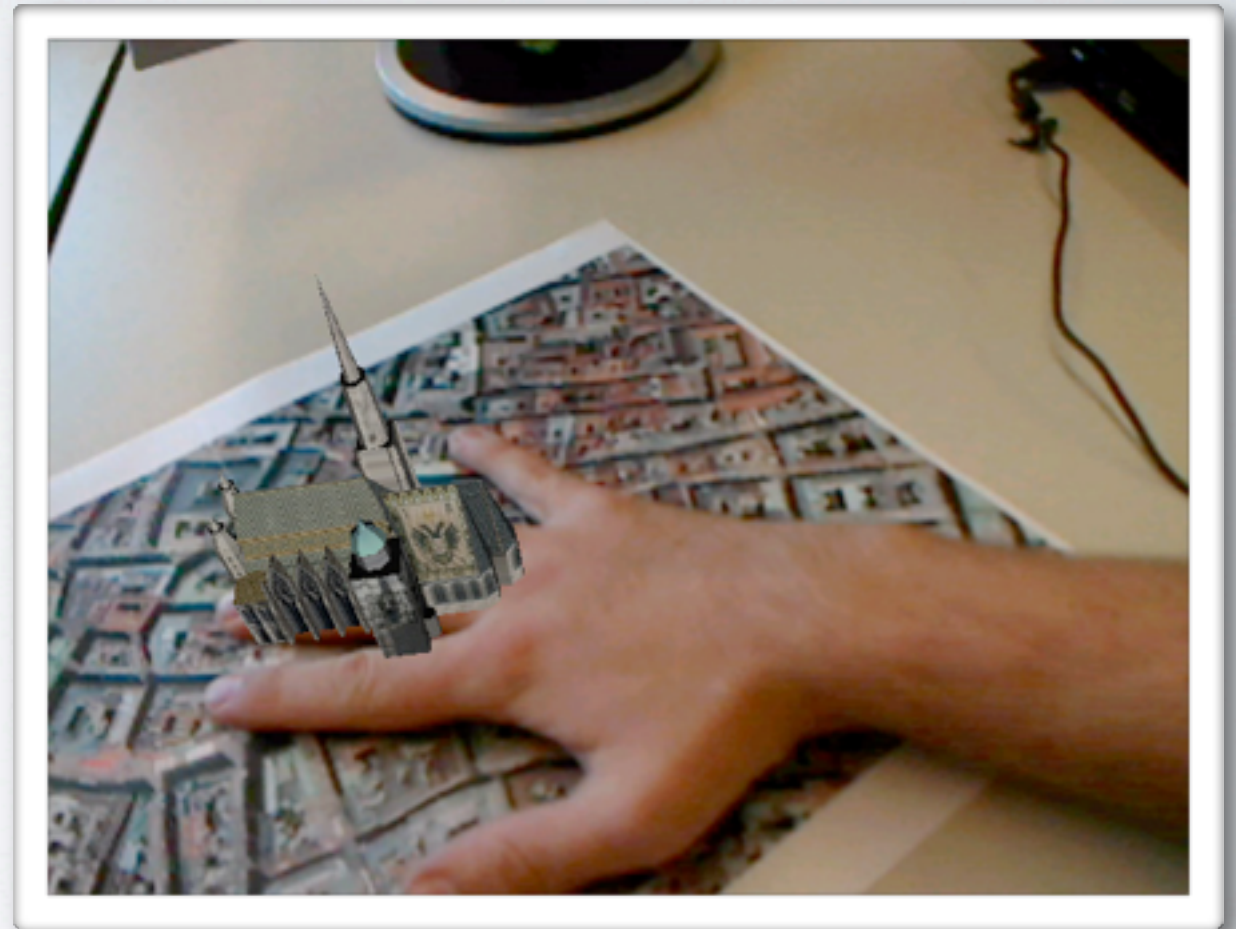
# STB TRACKER

- Imagination
- Commercial license
- More efficient and stable
- [http://studierstube.icg.tu-graz.ac.at/handheld\\_ar/stbtracker.php](http://studierstube.icg.tu-graz.ac.at/handheld_ar/stbtracker.php)



# 2D NATURAL FEATURE

- Graz University of Technology's Christian Doppler Lab
- Commercial license sold by Imagination
- [http://studierstube.icg.tu-graz.ac.at/handheld\\_ar/highspeed\\_nft.php](http://studierstube.icg.tu-graz.ac.at/handheld_ar/highspeed_nft.php)





**TRACKING**

# 2D NATURAL FEATURE

- Metaio
- Commercial license
- [www.metaio.com](http://www.metaio.com)



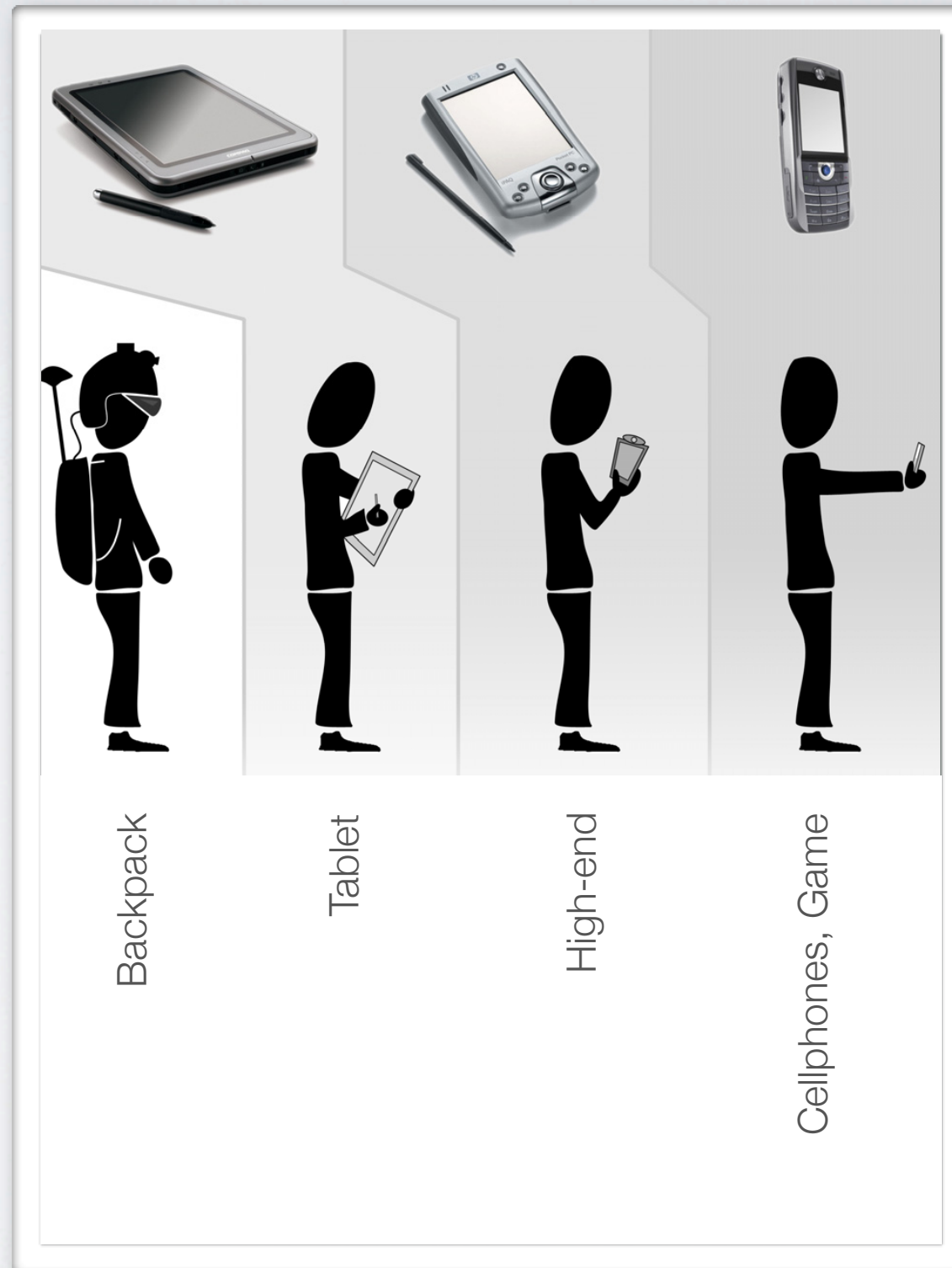
# **3D NATURAL FEATURE**

- Subject of active research
- An area that is currently being explored
- Nothing robust commercially available



**RENDERING**

# THE POWER OF PERSONAL COMPUTERS WILL BE IN PHONES SOON



**SO WE KNOW  
HOW IT WORKS**

**NOW WHAT?**



**TEACH A CLASS  
ABOUT...**

# **HANDHELD AUGMENTED REALITY GAMES**



# CHALLENGES

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## EDUCATION

Inter-institutional collaboration

**SCAD**

+



# CHALLENGES

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## EDUCATION

Artists vs Programmers

They think differently



# CHALLENGES

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## EDUCATION

Artists do not know the limitations of the technology and they design to make the game look pretty.

Result:  
something pretty to look at but no gameplay.

# CHALLENGES

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## EDUCATION

Programmers on the other hand know the limitations too well and they design around the technology.

Result:  
something works but boring and ugly.



# CHALLENGES

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EDUCATION





# CHALLENGES

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## EDUCATION





# CHALLENGES

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EDUCATION

Solution:

Think Like a Game Designer!

# CHALLENGES

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## EDUCATION

Focus on

what is the gameplay and what is the fun, without over-doing the graphics or over-thinking about the technical limitations



# CHALLENGES

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## EDUCATION

“Reinventing” existing games from different platforms:

PC, arcade, consoles, web, board games, etc.

# CHALLENGES

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DESIGN

Games



# CHALLENGES

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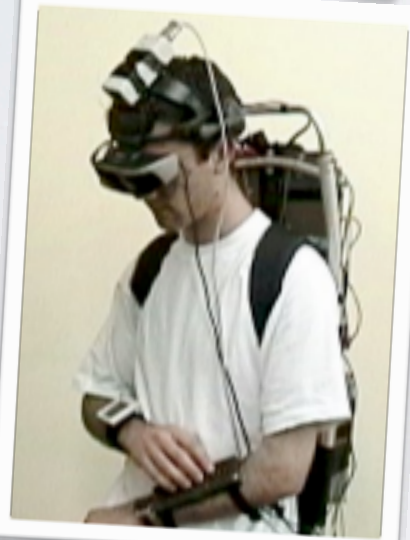
DESIGN

Handheld

# CHALLENGES

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## DESIGN





# CHALLENGES

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## DESIGN





# CHALLENGES

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## DESIGN

Something that is more than just a gimmick





# CHALLENGES

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## CONSTRAINTS

### **Hardware:**

Gizmondo

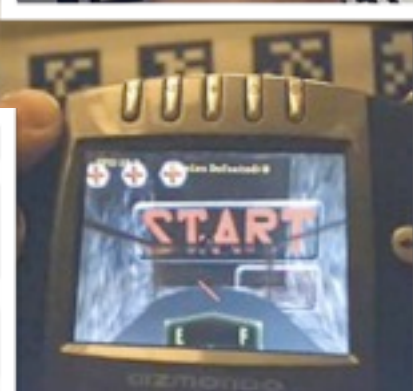
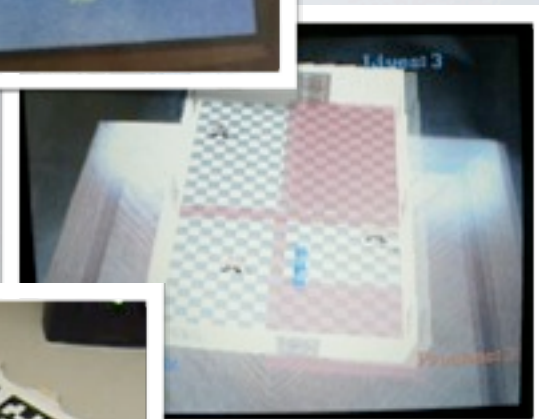
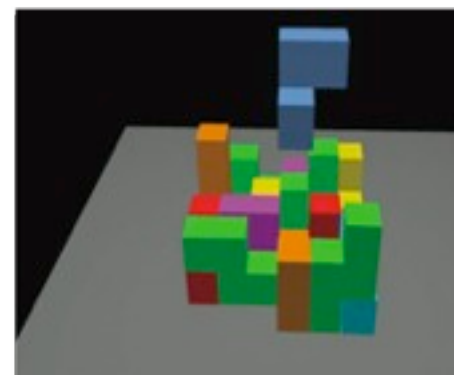
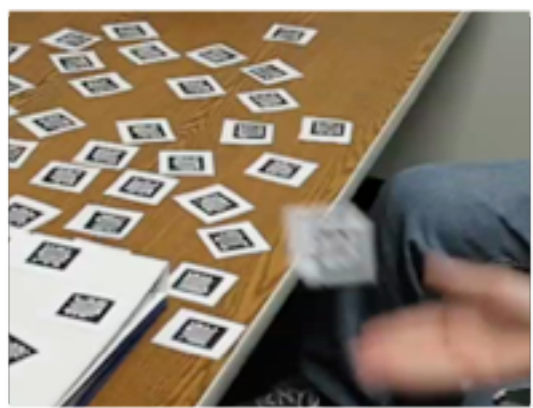
### **Software:**

No game engine -  
needed to code in the  
low level (C/C++)





# CLASS PROJECTS







# **JOE WARPIN**

An AR First Person Shooter (FPS)

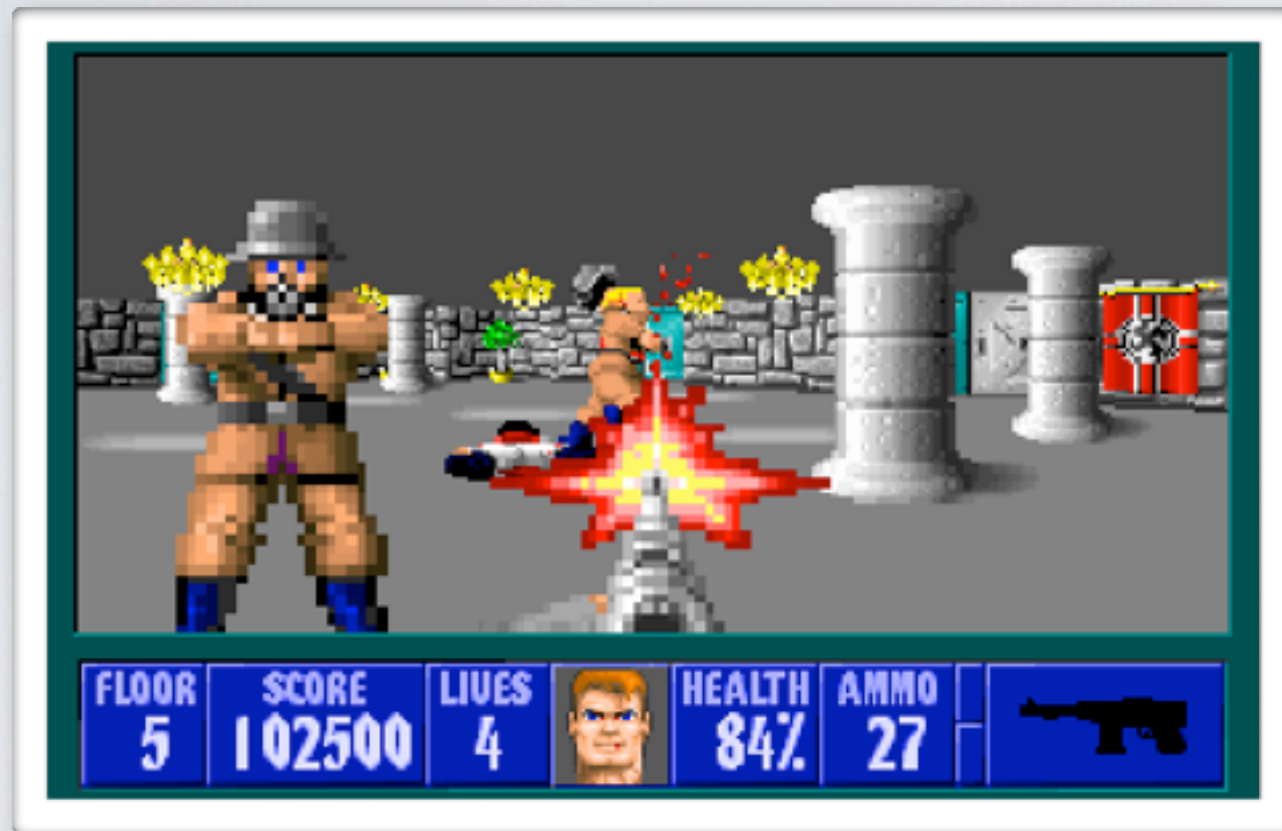
YES! FPS!!!



WHAT?! ANOTHER FPS????!!!!

# THE PROBLEMS WITH FPS

they are all “the same”



Wolfenstein 3D  
1992



Unreal Tournament III  
2007



# THE PROBLEMS WITH FPS



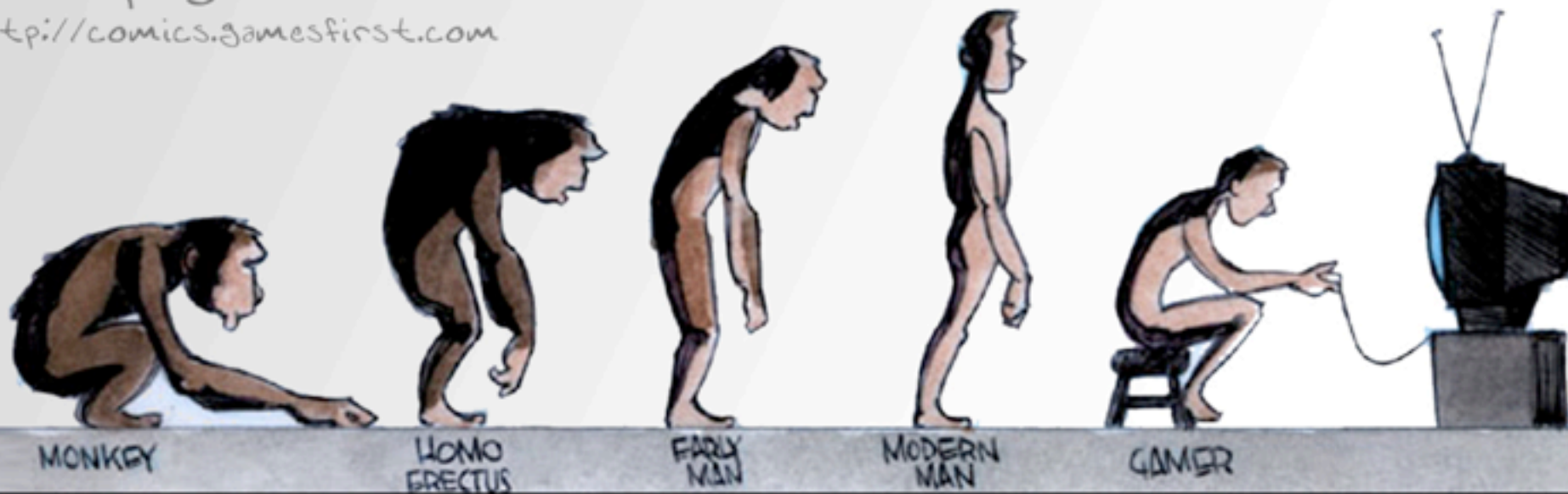
**they just sit there...**





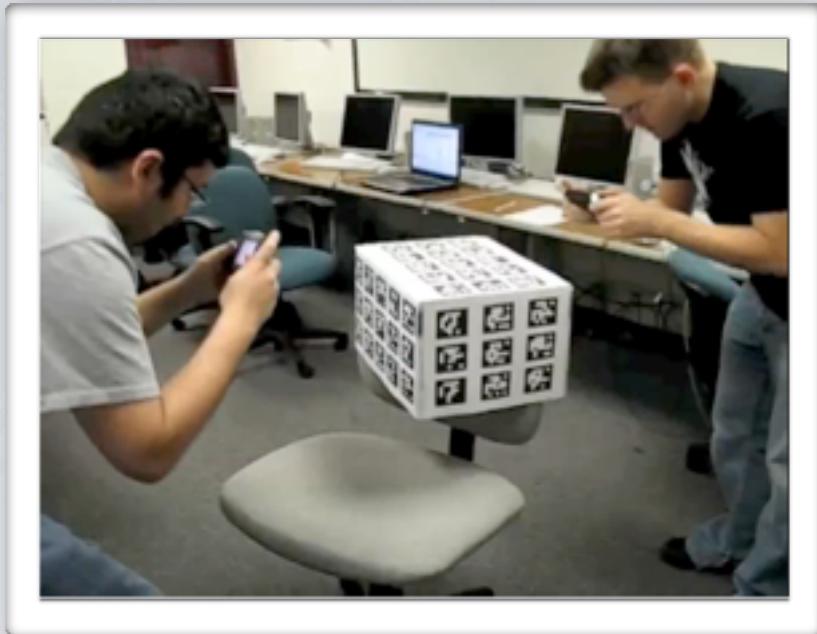
# THE PROBLEMS WITH FPS

Twooplayer Comics  
<http://comics.gamesfirst.com>





# REINVENTING **FPS**



# JOE WARPIN

by Andrew Orlando, Daniel Hunnicutt, Matt Canei, Timothy White

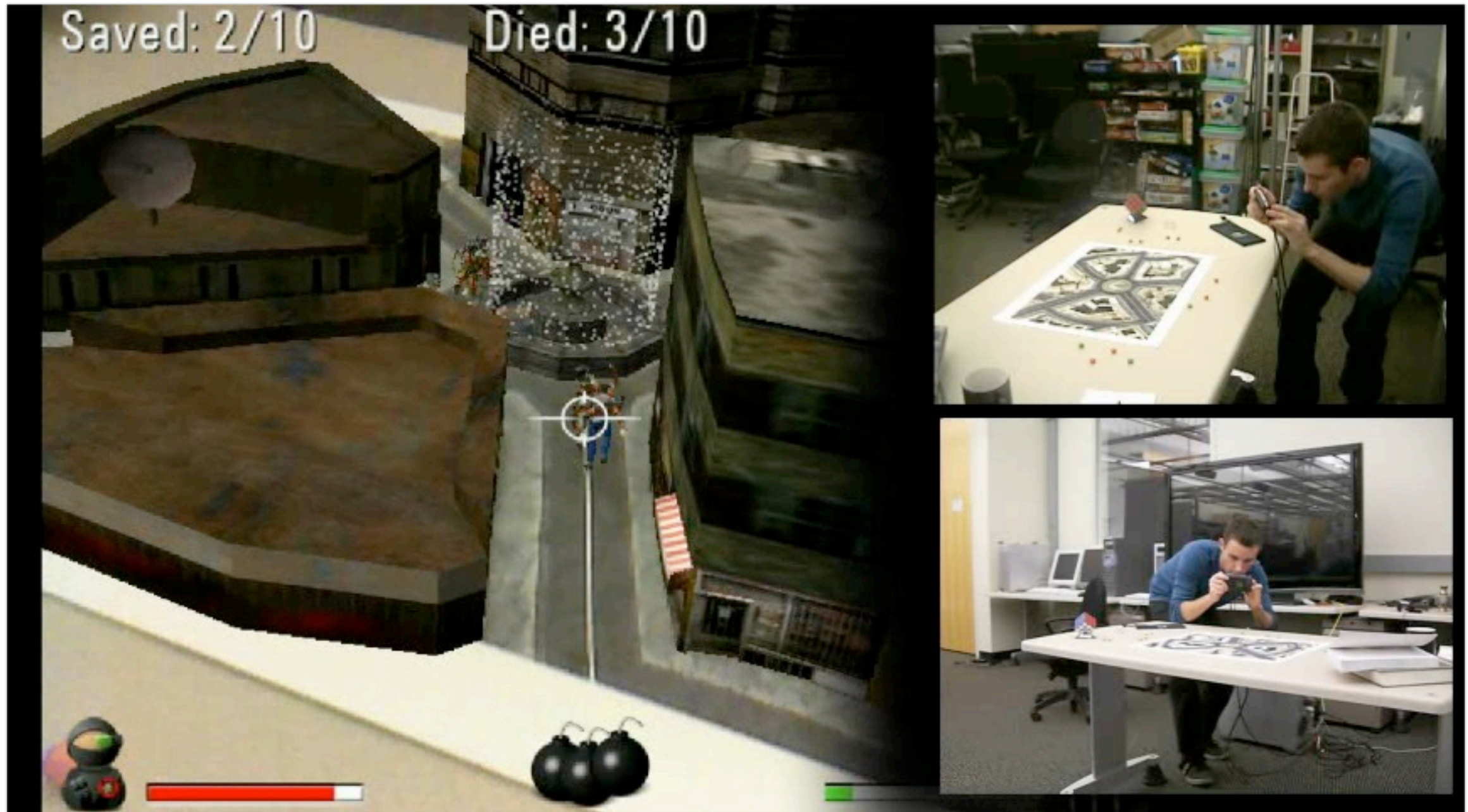




# ZOMBIE AR

by Blair MacIntyre, Kelli Baskett, Kimberly Spreen,  
Richard Summers, Tony Tseng





# ARHRRRR

by Blair MacIntyre, David Cochard, Karthik Raveendran,  
Kelli Baskett, Kimberly Spreen, Richard Summers, Tony Tseng



# REPEAT THE PAST

The screenshot shows the GameSpot website interface for the Xbox 360 game 'Modern Warfare'. The top navigation bar includes links for Home, PC, Xbox 360, Wii, PS3, PS2, PSP, DS, iPhone, Mobile, Forums, Videos, Cheats, New Releases, Downloads, News, and Movies & more. A search bar is located in the top right. Below the navigation bar, there are links for Reviews, Previews, Cheats, Answers, New Releases, Top Games, All 360 Games, Xbox Compatible, Xbox Live, and Getting Started. A 'My Games' dropdown menu is also present.

The main content area features a large image of the game cover on the left, with the title 'Modern Warfare' and the publisher 'Bethesda Softworks'. Below the cover, there is a list of game details: 'Rebellion', 'Modern Tactical Shooter', 'Release: Dec 1, 2009', and 'ESRB: Mature'. A 'More Info' button is located below the details.

In the center, there is a large image of a soldier holding a rifle, with the text 'This dreadfully boring, expletive-filled, extremely short shooter is an absolute rip-off.' and a 'Read the Review' link.

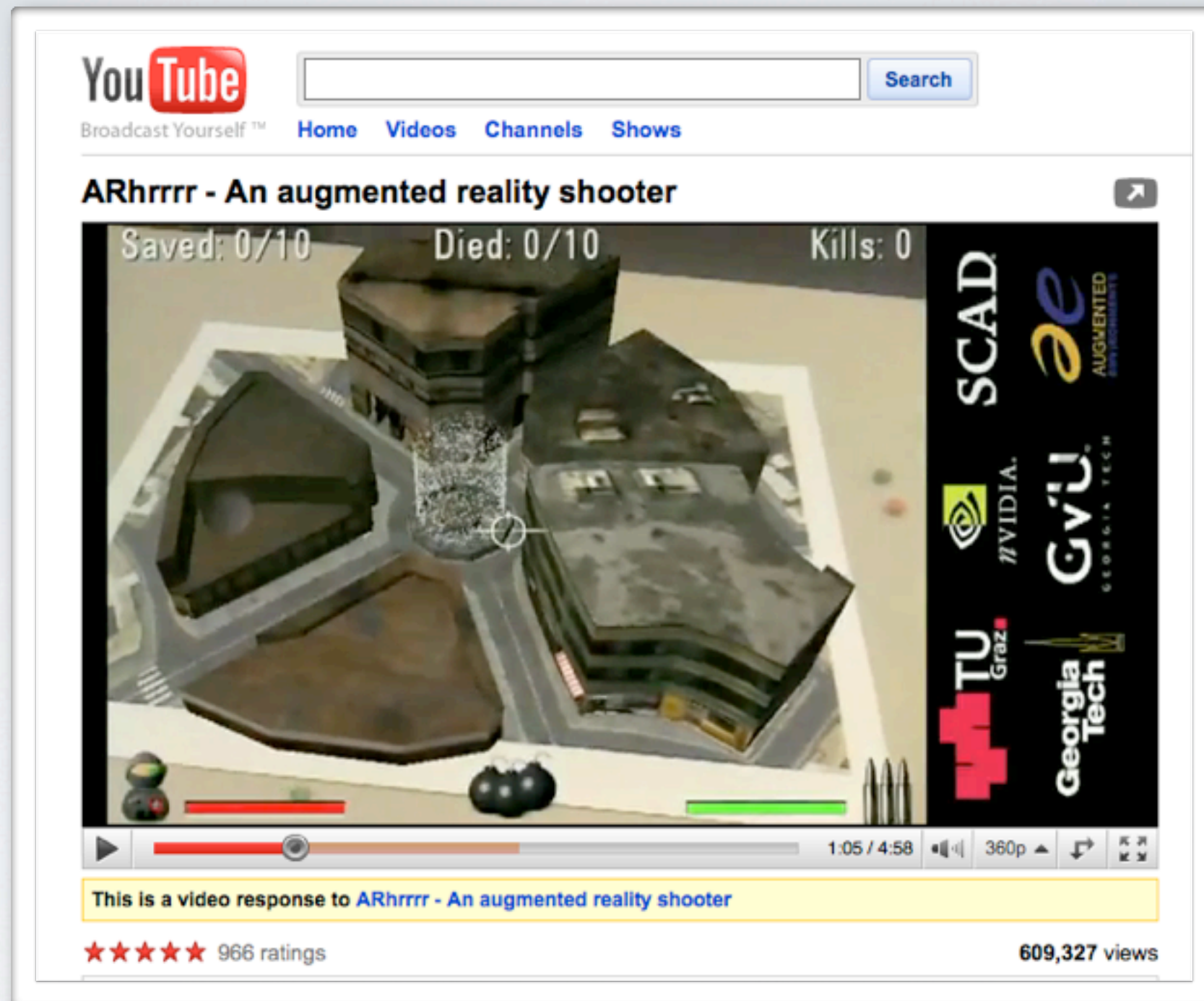
On the right, there is a section for the GameSpot Score, Critic Score, User Score, and Your Score. The GameSpot Score is 2.0 (terrible), the Critic Score is 2.8 (22 reviews), and the User Score is 2.9 (283 votes). The Your Score is N/A. Below this, there is a 'Review the Game' button.

At the bottom right, there is a section for 'Check Prices: \$29.99 – 89.51' with a 'See All' link. Below this, there are links to 'TigerDirect.com' (\$60.99), 'Amazon.com' (\$43.94), and 'eBay' (\$61.97), each with a 'SHOP' button.

Hundreds of People - X Years - Big Name Publisher



# DO SOMETHING DIFFERENT



7 people - 2 Months - School Project



**I SEE **AR** PLAY  
AN IMPORTANT PART IN  
THE FUTURE OF GAMING**



# MARKETING GAMES

Nestle Chocapic

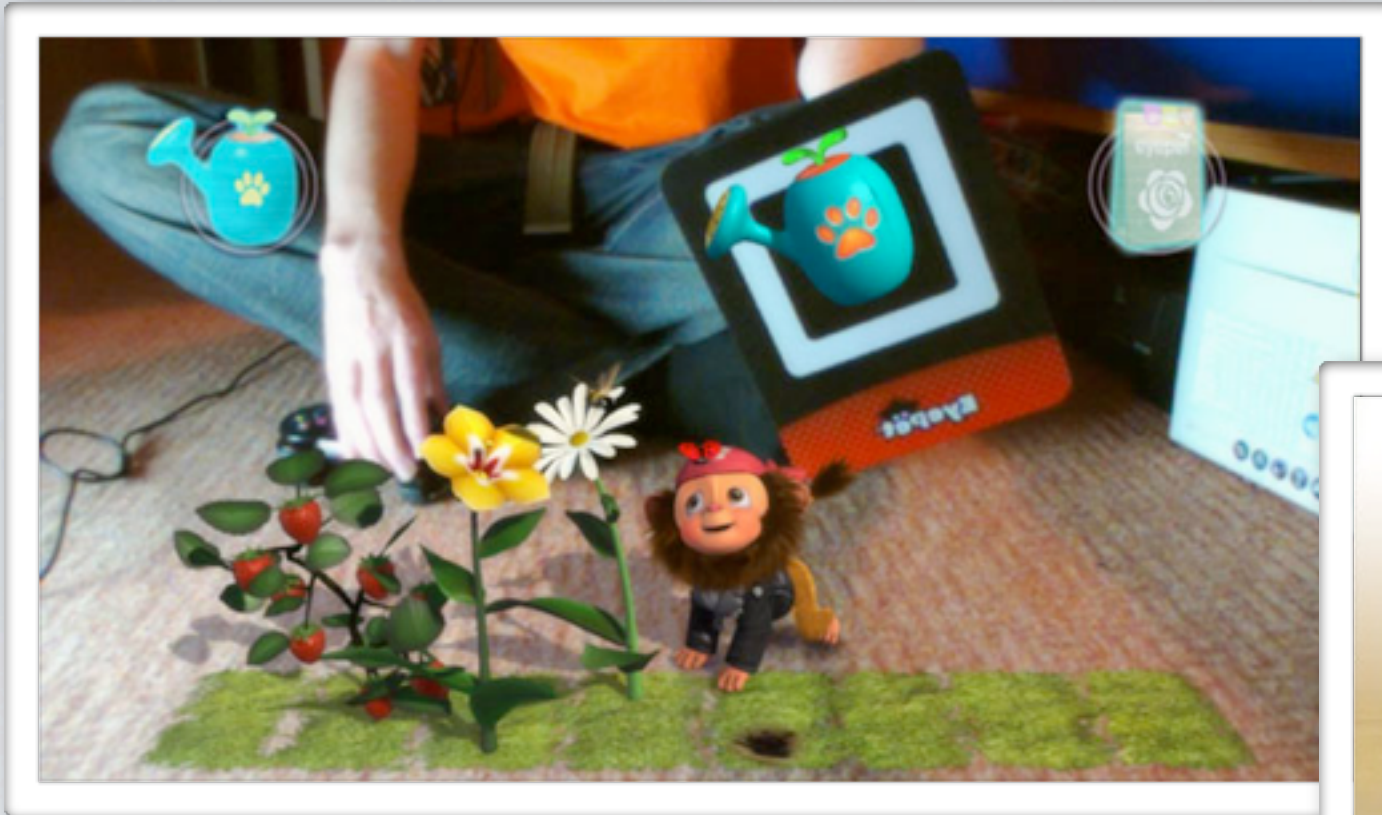




# HANDHELD GAMES

Invizimals

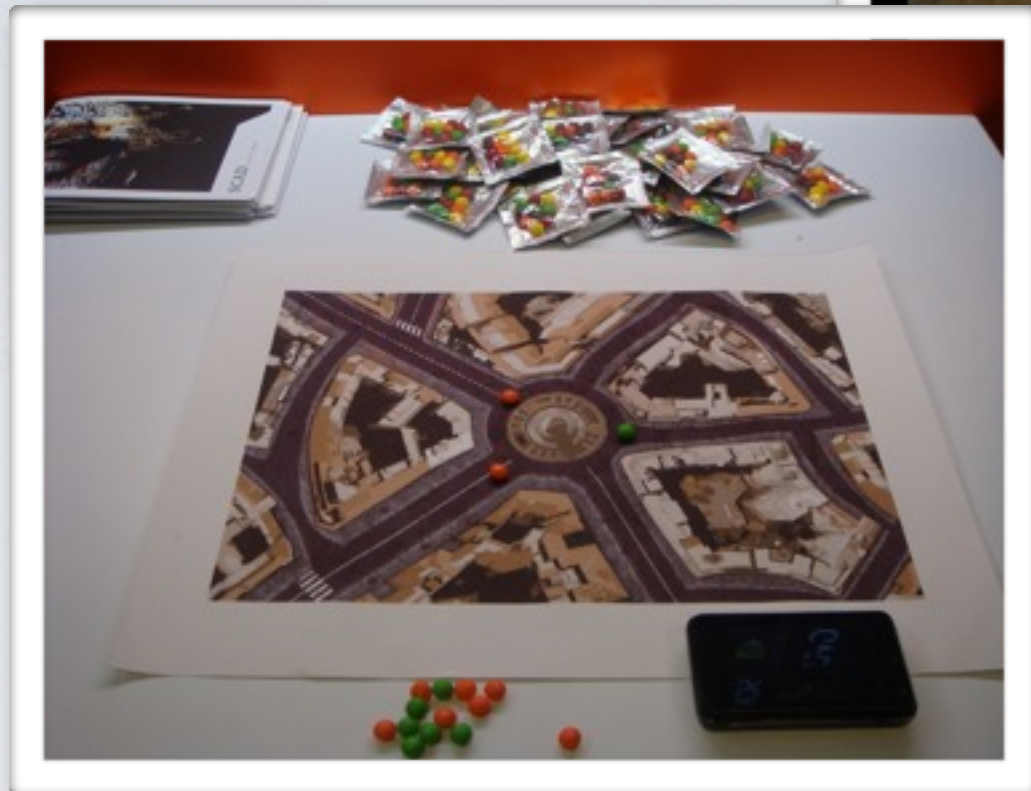




# CONSOLE GAMES

EyePet; Eye of Judgement





# MOBILE PHONE GAMES

ARhrrrr  
:)

**THERE ARE MANY  
OTHER POSSIBILITIES**



**THE TIME TO ACT IS NOW**

# THANKS TO

**SCAD**





# THANKS TO

Paula Wallace | **SCAD**

Matthew Maloney | **SCAD**

Blair MacIntyre | **Georgia Tech . Aura Interactive**

Kimberly Spreen | **Georgia Tech**

Evan Barba | **Georgia Tech**

Alex Hill | **Georgia Tech**

Daniel Wagner | **Graz University of Technology**

Lars Bishop | **NVIDIA**



# Thank You

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## QUESTIONS?

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