VR / AR Fundamentals
a practical guide to the big ideas

INTM-SHU 280C - 1  Topics in New Media & Entertainment  Fall 2017

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VR / AR Fundamentals

Week 1: Introduction

1. (Funny Question)
2. What are VR / AR fundamentals?
3. Who am I?
4. Who are you?
5. Class structure
6. Assignments & grading
7. Being “positively critical”
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1. (Funny Question)
How do you know I’m not a movie?
Mixing Board Analogy

subject -> representation
Artifacts
David Hockney, installation from De Young Museum, San Francisco, 2014
Michael Naimark, “Displacements”, Art Center College of Design, Pasadena, 2005
VR / AR Fundamentals

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2. What are VR / AR fundamentals?

Begin with our sensors
(our "inputs")

- sight & sound
- touch
- smell & taste
- (mind)
2. What are VR / AR fundamentals?

Begin with our sensors (our “inputs”)

- sight & sound
- touch
- smell & taste
- (mind)

And our effectors (our “outputs”)

- fingers & hands
- head position & gaze
- feet & body
- voice
- (mind?)
2. What are VR / AR fundamentals?

What does it take to “fool” our sensors and effectors into believing a representation is real?
2. What are VR / AR fundamentals?

What does it take to “fool” our sensors and effectors into believing a representation is real?

Start here . . .
2 - Spatiality and Immersion
2 - Spatiality and Immersion
2 - Spatiality and Immersion

Jiayi Wang
3 - Other Senses
(Haptic, Smell, Taste, Mind)
4 - Input and Interactivity

Jiayi Wang
2. What are VR / AR fundamentals?

Different communities and applications have different priorities for these fundamentals

- Cinema or Games (“Hollywood or Silicon Valley”)
- VR or AR
- Home or Location-based or Outdoors
- Immersive or “Casual”
- Cheap or Expensive
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3. Who am I?

“Michael Naimark” is easy to find online so let’s look at stuff.
“Displacements” (1980 / 1984 / 2005),
CAVS MIT / SFMOMA / Art Center College of Design, Pasadena
Artworks

The Karlsruhe Moviemap 09

Artist / Artist group
Michael Naimark

Title
The Karlsruhe Moviemap 09

Year
2009

Category
Installation, Computer-based work, Video, Computer-based interactive installation, Video installation
“See Banff” kineotscope

Banff Centre for the Arts
Interval Research Corporation

1993-94
“See Banff” kineotscope
Banff Centre for the Arts
Interval Research Corporation
1993-94
“Dimensionalization Studies”

w/ H Baker, J Woodfill, P Debevec, L Villareal

Interval Research Corporation

1994
Abstract

"Viewfinder" is a novel method for users to spatially situate, or "find the pose," of their photographs, and then to view these photographs, along with others, as perfectly aligned overlays in a 3D world model such as Google Earth. Our objective is to provide a straightforward procedure for geo-locating photos of any kind, and our approach is to engage a community of users for a certain amount of human help. We specify that a 10-year-old should be able to find the pose of a photo in less than a minute, and we are convinced that this goal is achievable. While we are not entirely there yet, we are getting closer. This is our progress report.

April 3, 2008
“Be Now Here,” Michael Naimark, Interval Research and UNESCO, 1995
3D panning motion picture and rotating floor
“Be Now Here Triptych”, Michael Naimark, USC, 2008
3D, motion, sound, but same footage spatially offset
3 screens over 180 degrees
“Be Now Here Triptych”
USC Cinema
2008
“Be Now Here Triptych”

USC Cinema

2008
VR Cinematography Studies for Google
Exploring how people are represented in VR

with David Lawrence and James McKee
The Setup
Jump VR camera
Area taped off with 12 “hour” radials in concentric rings
Our intention was to explore how people are represented in VR.
3. Who am I?

Teaching this class

and (my current projects):
1) Community-based Interactive Hyper-Images
2) VR Virtual Travel “Super StreetView”
3) First-Person VR via a Wearable VR Camera

and maybe reformatting (older work):
“See Banff” and “Be Now Here” for projection VR
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4. **Who are you?**
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4. Who are you?

Please say a bit about yourself and why you are interested in VR and AR!
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5. Class Structure

This is a new and experimental class

The first half semester will be learning the basics and seeing what’s out there

The second half semester will be producing short, entertaining, “studies” relevant to VR / AR today
5. Class Structure

First half semester

Week 1 - Introduction to VR and AR

Week 2 - FUNDAMENTALS 1: Audiovisual Resolution and Fidelity
Fooling a single static eye and single static ear experiencing a framed representation.

Week 3 - FUNDAMENTALS 2: Audiovisual Spatiality and Immersion
Fooling two static eyes and ears, then two moving eyes and ears, then removing the frame.

Week 4 - FUNDAMENTALS 3: Other Senses (Haptic, Smell, Taste, Mind)
Fooling the other senses.

Week 5 - FUNDAMENTALS 4: Input and Interactivity
Using our effectors as inputs and how they shape interactive experiences.

Week 6 - FUNDAMENTALS 5: Social and Liveness
Being immersed with other people and live events.

Week 7 - Current Dilemmas
This is a lead-in, “pre-production,” to the second half-semester.
5. Class Structure

First half semester

The weekly routine will be:

Mondays:
Michael’s “fundamentals” presentations
(with lots of time for Q & A)

Wednesdays:
Students assignments presentations
(and posts on IMA Documentation blog)

Mondays and Wednesdays:
VR / AR “News of the Week”
5. Class Structure

Second half semester

The weekly routine will be conceiving, producing, and documenting short “studies.”

Like the Google Cinematography Studies, they’ll typically be under one minute each.

We should be able to make at least one per week.

We will work as a team.

The goal is to make them public.
VR Cinematography Studies for Google

Exploring how people are represented in VR

with David Lawrence and James McKee
Our intention was to explore how people are represented in VR.
The 360 degree “equirectangular” format turns the radial lines into parallel lines. Here’s the active left eye view from a stereo pair. (Yep, that’s a full 360 degree view of the last slide!)
(1)
Close-Up Artifacts
(2) Recognizability
Walking backwards from the 1 meter “close up” ring to the 5 meter outer ring and beyond to 10 meters.

Not much recognizability beyond the 5 meter outer ring.
(Remember, there is no natural zooming in VR.)

[audio]
(3) Camera Height / Eyeline
Camera height 5 feet, at eyeline of subject

Privilege is equal

Viewer’s head is level

Camera height 3 feet, below eyeline of subject

Privileges subject

Viewer’s head tilts up
(4)
First Person / Third Person Solo Lip Sync
Hi. My name is . . .” not looking into camera.

Hi. My name is . . .” looking into camera.

[audio]
(5)
First Person / Third Person Two Shot Lip Sync
Zach on left moves closer to Todd on right.
Both maintain eye contact.
[audio]
1: Zach and Todd are directly opposite the camera.

2, 3, 4: Zach and Todd are offset from the camera.
(6) Hyper-real Compositing
“Credible” hyper-image composite. Everyone was shot separately. Soft looping for ambient movement.
“Incredible” hyperimage composite.
[audio]
Everyone was mic’ed and shot separately. Various spatial audio mixes.
[audio]
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Assignments will mainly be to find and present:

1) relevant VR / AR content for the week’s topic

2) relevant content from other media for this week’s topic

All assignments must be documented on the IMA Documentation blog http://ima.nyu.sh/documentation/

(I will help with pointers and suggestions!)
6. Assignments and Grading

Grading Components

First Half-Semester
Finding, presenting, documenting: 60%
In-class critical discussion: 30%
Readings and video assignments: 10%

Second Half-Semester
Production team member: 60%
In-class critical discussion: 30%
Readings and video assignments: 10%
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“Throwing the Medicine Ball.”
VR / AR Fundamentals

Week 1: Assignment for Wednesday

Read:

Concept and Syllabus on http://ima.nyu.sh/vr-ar-fundamentals/ (!!!)

Post and Present:

Of the 16 Lessons, which one you MOST agree with and which one you LEAST agree with. The posts can be very short, like one or two sentences for each.
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