Session 02 - 08/24/17

Intro & Recap

- Miscellaneous reminders:
  - Remember that lecture slides, notes, and reading will be on github
  - Today will mostly be spent working in Unity, building our skills
    - First session of each week will usually be talking/discussion, second sessions will be more technical.
- Topic Recap
  - We want to come up with a working definition of AR/VR
  - *Inducing targeted behavior in an organism by using artificial sensory stimulation, while the organism has little or no awareness of the interference.* - LaValle
  - Immanuel Kant - Dual nature of reality
    - Physical world vs perceived world.
  - So much out there is marketing term or people trying to be the first to coin phrases.
    - As far as this class is concerned, we're drawing the line here:
    - **Virtual Reality** = Where everything that the user sees & hears is controlled by the created experience.
      - It is a world built from the ground up, and you (as the creators) are responsible for creating all the rules of how this world behaves and what the expectations are.
    - **Augmented Reality** = You are adding things to the real world.
      - The rules/expectations of the real world still apply, and you can leverage that to your advantage.
    - What about *Mixed Reality?*
      - You'll see this term a lot if you start looking up Hololens tutorials or example projects.
      - Mixed Reality is a *type* of augmented reality, where the physical (ie - the real world) and the virtual can interact and affect each other. More than just an overlay onto your field of view, MR knows what you are looking at.
  - We will be working mostly in AR for the first part of this course

Working with Hololens

- **Google Glass** - April 15, 2013 Google glass comes out.
  - This is, for many people, the first "mainstream" or "Consumer" head-mounted display.
  - This is **NOT AR**. Why?
    - It is just a screen that floats in your field of vision.
    - It does not have any relationship to 3D space that you are in …. just provides some contextual information.
- Reason we bring up Google Glass is to look at the way it's display works
  - Google Glass uses a translucent mirror to reflect a projected image onto the back of your eye.
  - Projected image was about the size of the projector itself, so it was very small (floated in the corner of your vision).
    - Small image is bad for **immersion**
- **Microsoft Hololens** is a "developer" device (i.e. technically not for consumers...yet)
  - Two **huge** technologies that make it a killer AR headset
  - **Display**
    - Hololens uses a *wave-guide* based screen. Projected image can be much bigger than the projector.
    - Still very limited in size, but (barely) able to cover your field of view instead of just a corner of your vision.
      - Much much better for feeling of immersion and presence
    - Check out the reading list below for a much more technical explanation of the screen.
  - **Sensors**
    - The Hololens is made by the same company as the Kinect
      - Uses similar technology to constantly map its surroundings and feed that data back into the experiences that it is running.
- So why use Hololens for this class?
  - Even though it is not widely available, expensive, and technically only for “developers,” it is **really good at what it can do**. Not a lot (that we can use in class) currently comes close
  - It is currently the only wearable device that comes close to “ideal” AR, so we will use it as our ideal test lab.

Jumping into coding

- **Creative Coding** is a type of computer programming in which the goal is to create something expressive instead of something functional.
    - In this context we can use code to enable/empower/drive our creative and aesthetic projects. It is the other side of the same coin as Unity's graphical editor.
    - The emphasis on the code we write in this class is to enable prototyping quickly

Assignments for next time

- Finish reading: Virtual Reality - Chapter 1
- Make sure you've set up Unity somewhere you can work.
- Find examples of AR that interest you, or that you would possibly like to copy or borrow for a project. Try some creative coding blogs like Creative Applications or Prosthetic Knowledge

Coding Resources

Some of you asked for suggestions on where to turn to learn coding.

- Hello Unity is a great place to start that would specifically help you in *this* class. He covers a good intro to Unity as well as coding in general.
- One of my favorite general learn-to-code resources is anything by Daniel Shiffman at NYU. He has a series of videos called Computer Programming for the Total Beginner, but once you've got the very very basics down (what are variables? what are functions?) I would highly recommend his Nature of Code videos.

Extra reading

This is not required! Just some additional resources you might find interesting/relevant/funny.
How Hololens Displays Work
How Augmented Reality is Revolutionizing Museums, Schools and Jobs
Google Glass 2.0 is a Startling Second Act