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## Teaching VR and AR

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# Teaching VR and AR

Sam Shippey



# How I got here

- Started as a project about something entirely different
- Mentor became interested in VR and AR
- We bought a VR headset, played around in Unity, decided to take it to students.



# Teaching turns out to be kind of hard

- Tutoring is a lot easier than teaching!
- Many students have many different needs.
- Scheduling and content generation must take place significantly in advance.



# VR “Virtual Reality”

- Fully immersive experiences
- Emerging technology with many different applications
- Applications include
  - Robotics
  - Gaming
  - Training
- Usually treated as a gaming technology
- Heterogeneous hardware makes teaching very complicated



# AR “Augmented Reality”

- One foot in virtual reality, one foot in real reality
- Very computationally expensive
  - Incorporates advances in computer vision, rendering, etc
- Even more heterogeneous hardware
- Applications vary
  - Games (think Pokemon Go)
  - More training
  - Informational applications



# COVID-19 Responses

- Not a research problem, but a problem beyond the research
- Physical instruction with VR devices is no longer possible
- Dealing with this is complicated
  - Mailing headsets to students
  - Emulators
  - Research projects
  - Alternative sections of the field (ie AR)



# Dealing with hardware availability

- Students are unable to acquire headsets easily
- Headsets run >\$400
- We decided to use:
  - Grouping students into no more than 10 groups
  - Offering alternative final projects
    - Mobile projects
    - Research
    - Paper review
  - Pivot towards AR content





# Unity

- All encompassing game engine
- Chosen for ease of use with most VR headsets
- In practice is unstable and involves significant troubleshooting
- First lab saw over an hour of purely Unity troubleshooting
- C# isn't taught anywhere else in the school, but few problems arose in practice.
- Giving hour and a half long presentations is actually very challenging



# Next steps and data collection

- Data collection will mostly be done with the students who take the course
- Qualitative as opposed to quantitative
- Continually redesign after this term with what we learn
- Possibly adapt further to online learning
- We will continue to offer the course and rapidly adapt to new challenges