

## Homework Assignment #2: FINAL

### Virtual and Augmented Reality

NBA 6120

**Assigned: September 30, 2015**

**Due: October 9, 2015**



On March 25, 2014, Mark Zuckerberg announced that Facebook agreed to acquire Oculus VR, a Virtual Reality company. With the belief that future human-computer interfaces will enable more useful, entertaining, and personal experiences, Facebook paid slightly more than \$2Bn. Although gaming has been among the first applications explored and commercialized, the ability to have “presence” in another place, to experience the impossible, has vast implications that we don’t yet fully understand. Consider trying to imagine the world of smartphones 10 years ago; will the implications of virtual reality as a platform be the same?

Facebook’s acquisition of Oculus VR sent reverberations throughout the industry and was soon followed by other major companies not wanting to be left out of a potential disruptive

technology. In September 2014, Microsoft acquired Mojang AB, the company that developed Minecraft for \$2.5Bn. Of course, Microsoft has been trying to attract more users to its mobile systems, and recently used the popularity of Minecraft to draw attention and open speculation around its own HoloLens system. Not to be outdone, in October 2014, Google, with others (Andreessen and Horowitz, Qualcomm, KKR, Kleiner Perkins, Paul Allen) paid more than \$500M for Magic Leap, a tech start-up that describes itself as a “developer of novel human-computing interfaces and software.” Although the company has been vague about its objectives, it has publicized some of its work in Augmented Reality (AR), a technology for merging virtual and real world imaging.

Lastly, a few days ago John Carmack of Oculus announced that Microsoft has allowed its block-building open-world game Minecraft to be implemented on Gear VR and Oculus devices. With these investments, and footholds in the game industry, the VR/AR industry has a large financial base, funding for research and development, and a substantial customer base. It will not go away! Will this technology with its subsequent improvements be a harbinger for future communication and entertainment in the digital world?

As discussed in class, the technologies available for individualized displays are rapidly improving, some at exponential performance rates. High resolution, miniaturized display devices have vastly improved, both in form-factors and cost, rendering capabilities on client devices are still improving with Moore’s law, and bandwidth, although still constraining, is generally available except for the last mile in rural areas. Just witness the growth of multi-player games or two children competing against each other across an aisle.

At the same time we are entering a new era where a plethora of novel geometry acquisitions devices are rapidly becoming available. No longer does one have to go to a specialized facility to scan a specific object or person as mobile devices with high resolution megapixel cameras will be readily available. Using multiple photographs, computational photography, light field cameras, infra-red sensors, time-of-flight devices, etc. geometries and other information can be easily captured, recorded, analyzed, used, etc. by any one at any time. For micro-environments (local), the technology will evolve to enable the recording and transmission of both static and dynamic data. For macro-environments, information derived from Google’s Street View, tourist agencies, national parks, etc. will be stored and made available on the web. How will ownership, control, and access to this data be managed in a world where digital environments are becoming ever more pervasive in society?

So why did Facebook buy Oculus, Microsoft buy Minecraft, and Google and venture capitalists invest in Magic Leap? What is the “killer app” that those oligopolies will create to enhance their already lucrative revenue streams?

1. Identify a potential application which could use captured geometric information and be developed into a major business opportunity using VR or AR (1 page).

2. Describe the technology which you would use to acquire the geometry. In this same section, describe where the information will be stored, either locally or in the Cloud and how your end product will be delivered. (1 page)
3. Describe the current impediments for adoption and what must be improved to “cross the chasm” for public acceptance (1 page)
4. Lastly, describe the partnerships and business model for your proposed application (1 page)
5. Two slides (the first should be a terse verbal description of your application; the second should be a photo-montaged visual depiction).