

Project Name: Open-source head-mounted augmented reality (AR) display

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Motivation: To develop an inexpensive, open-sourced AR display much like the Google cardboard is for VR displays.

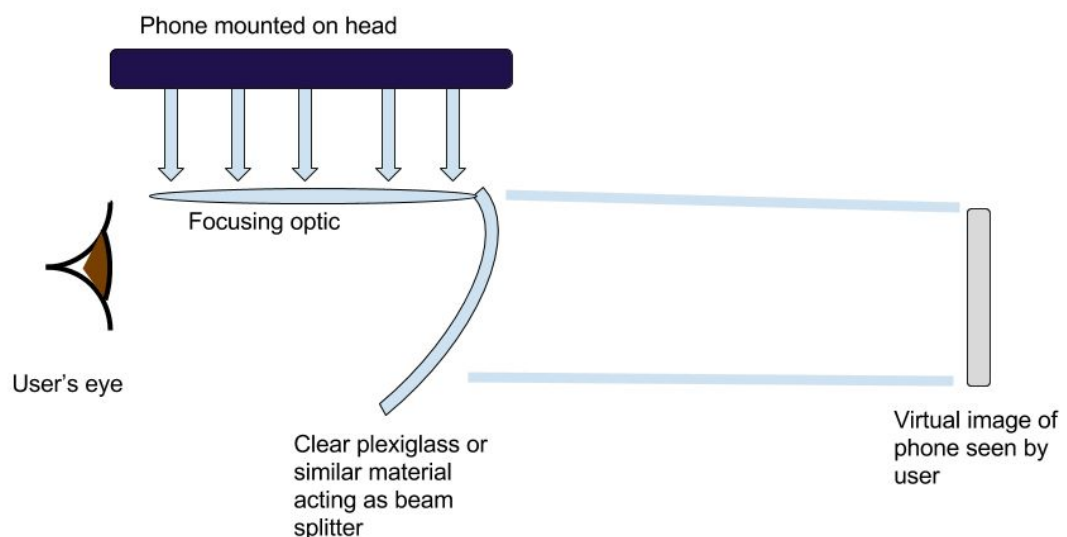
Related Work: Google Glass, Google Cardboard, Microsoft HoloLens etc.

Overview:

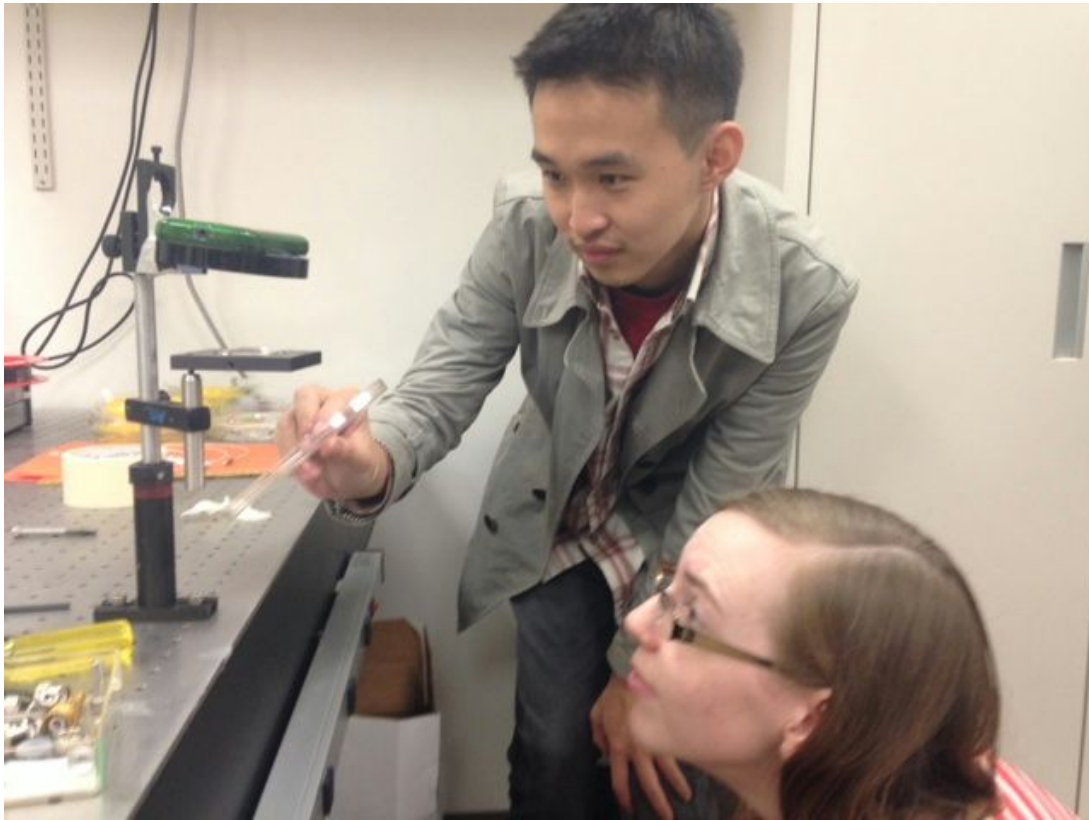
We are considering developing an inexpensive, open-sourced head-mounted display for AR. The device aims to display the data from a projection source while at the same time allowing the user to see the real world around him/her with minimal obstruction. This is much like the Google glass, however, to make it affordable to everyone, we propose three main improvements in our design: 1) use a smart-phone screen as the projection source, 2) a curved plastic glass as the beam splitter and 3) cardboard as the holder of the whole system.

Milestones and Goals:

Our milestones will essentially be perfecting the design of the three main components of our system: 1) The free space optics designed to form virtual image of the phone display 2) The holder for the phone and free space optics 3) beamsplitter. These will require simulating the optical design in Zemax, adjusting the parameters of lens, curved plastic glass to get a satisfying field of view, experimenting and realizing the design in free-space optics and finally fabricating the compact version with cardboard or other easily obtainable materials. If time permits, we will investigate ways to adjust the location and size of the phone screen in the user's field of view, for example moving it to the side and shrinking it so that it is less obtrusive and more suitable for everyday use.



A general schematic view of the system we propose to build



Our project in an early stage of development

References

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- [3] "Low-cost Augmented Reality prototype for controlling network devices", Nguyen A Banic A, 2014
- [4] "Augmented reality: an application of heads-up display technology to manual manufacturing processes", Caudell T Mizell D, Proceedings of the Twenty-Fifth Hawaii International Conference on System Sciences, 1992 vol: 2 pp: 659-669 vol.2