

CS294-164 Report - Week 10

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1 Adaptive optics for studying visual function: A comprehensive review

1.1 Main Idea

The paper provides an overview of all approaches that use Adaptive Optics in vision science. Applications of AO can be broadly split into two types: retinal imaging and testing visual functions. The review also touches upon the types of science that can be accomplished with AO with a view to future applications. Keratoconus is an example where introducing the visual correction can make the visual acuity worse. Although AO-correction provided an immediate benefit to vision, the question remained as to whether the visual system was equipped to take full advantage of the new, unprecedented spatial detail delivered to the retina, and also to what extent the retina could sample the corrected retinal image.

1.2 New Ideas based on readings

How does aberration correction affect projects like Oz Vision? In the future, could there exist a mechanism to automatically correct any aberration that might occur. For example, is there a way to do this in VR/AR such that it would permanently correct any aberration.

2 High Resolution Imaging in Microscopy and Ophthalmology

2.1 Main Idea

The paper talks about targeting individual photoreceptors in the retina for visual function testing. The authors describe in detail, the challenges around stimulating specific cells in the retina. Particularly correcting for monochromatic aberration, stimulus light modulation and image motion compensation, chromatic dispersion compensation. The combination of the technological innovations described in this paper have enabled the study of in vivo psychophysical responses when single cones or groups of cones have been targeted for stimulation.

2.2 New Ideas based on readings

One phenomenon that remains unexplained is that some cone cells are more sensitive to light than others. Is there a way to analyze this, find patterns/explanations for this using the Oz Vision system. It would also be interesting to find applications of wavefront technology in cameras.