Perceptually-guided Multi-color Holograms unlock Brighter Images in Holographic Displays

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Abstract: This talk introduces an emerging hologram type known as Multi-color holograms. These holograms can provide brighter scenes and improve refresh rates in standard holographic displays without requiring any major hardware modifications in these displays.

1. Introduction

Holographic display technologies [1] for Virtual Reality (VR) headsets and Augmented Reality (AR) glasses promises a variety of optical qualities that could help support true 3D, improve dynamic range and generate vibrant colors [2]. If further research validates these promises, holographic displays with diffractive processing capabilities [3] could help deliver realism in 3D experiences in the future [4]. In this talk, I will describe how current holographic displays are limited in terms of brightness as the conventional method [1, 5] involves displaying single-color holograms time-sequentially, leaving a fix amount of time to provide illumination for each color primary. Unlike this conventional method, the method that I am going to describe utilizes three light sources to illuminate each displayed hologram simultaneously at various intensity levels. This new method [6, 7] involves co-optimizing holograms and their corresponding light doseages for each color primaryy using a perceptually-guided loss function [8, 9]. All our implementations use our differentiable toolkit [10, 11], and could be accessed using GitHub:complight/multicolor.

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