Perceived Humanness Bias in Additive Light Model Displays

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Additive AR Displays

Create virtual imagery by adding light to the observer's view of their physical environment
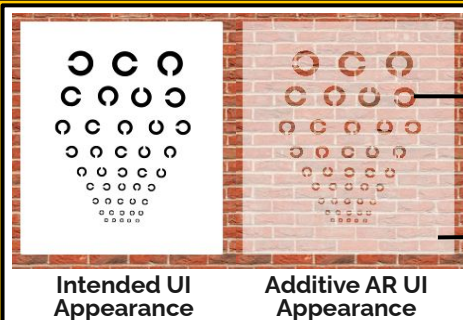
Microsoft HoloLens 2

Magic Leap One

Limitations:

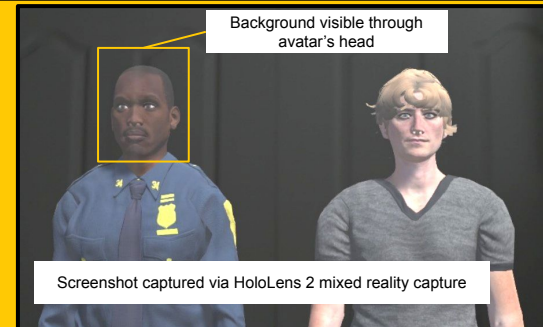Imagery typically cannot appear to be darker than observer's environment

Image appearance blends with appearance of observer's environment

Intended UI Appearance   **Additive AR UI Appearance**

Black imagery appears completely transparent

Light-colored imagery appears semi-transparent

Background visible through avatar's head

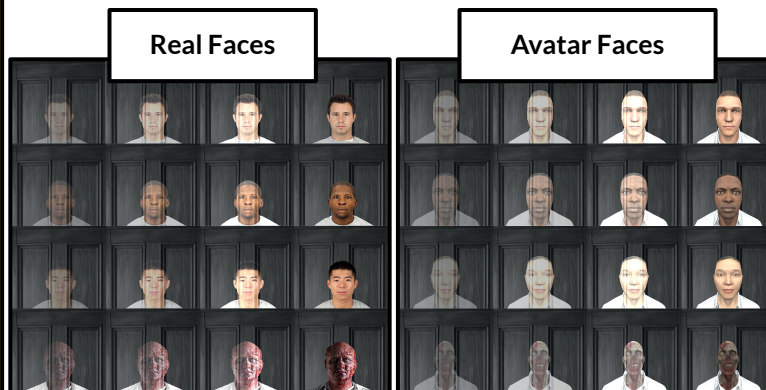Screenshot captured via HoloLens 2 mixed reality capture

Methods

Independent Variables:

- **Opacity Level** (4)
  - 35% additive
  - 68% additive
  - 100% additive
  - 100% normal
- **Appearance** (2)
  - Real
  - Avatar
- **Model** (4)
  - White
  - Black
  - Asian
  - Zombie

Condition Images

Real Faces

Avatar Faces

Humanness Measure

Subjective Perception of:

- Human
- Robot
- Unearthly
- Had Emotions
- Felt Physical Pain
- Had Complex Thoughts

All Likert Scales [0-100]
0: Not at all
100: Very Much

Results & Implications:

- Perceived humanness increases with opacity level.
- Darker colors appear more transparent on OST displays
- **Virtual humans with darker skin tones or clothes will be perceived to be less human**