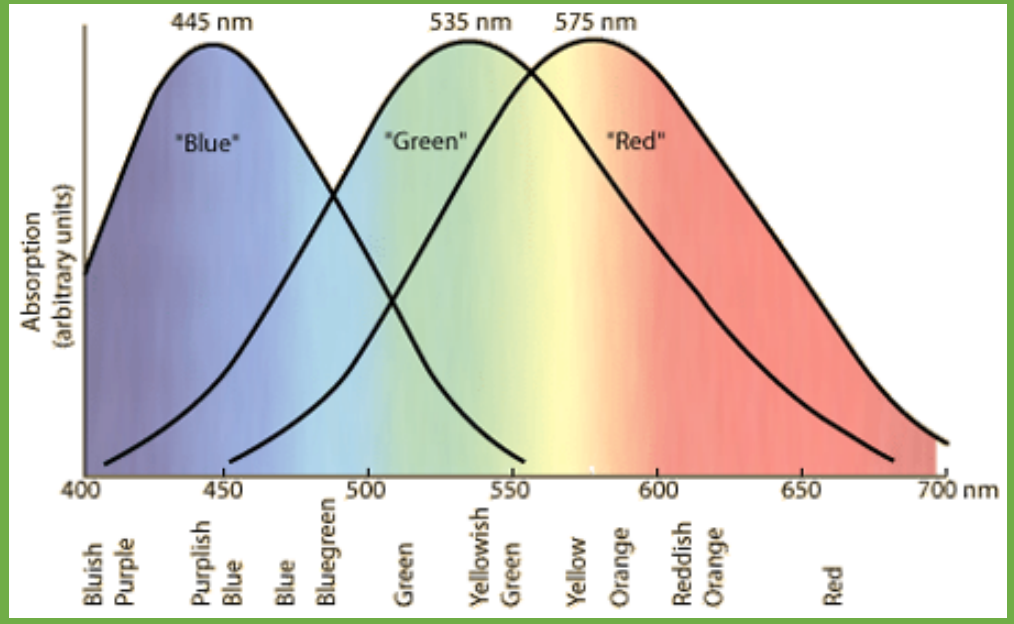
Computer Corrected Color Blindness

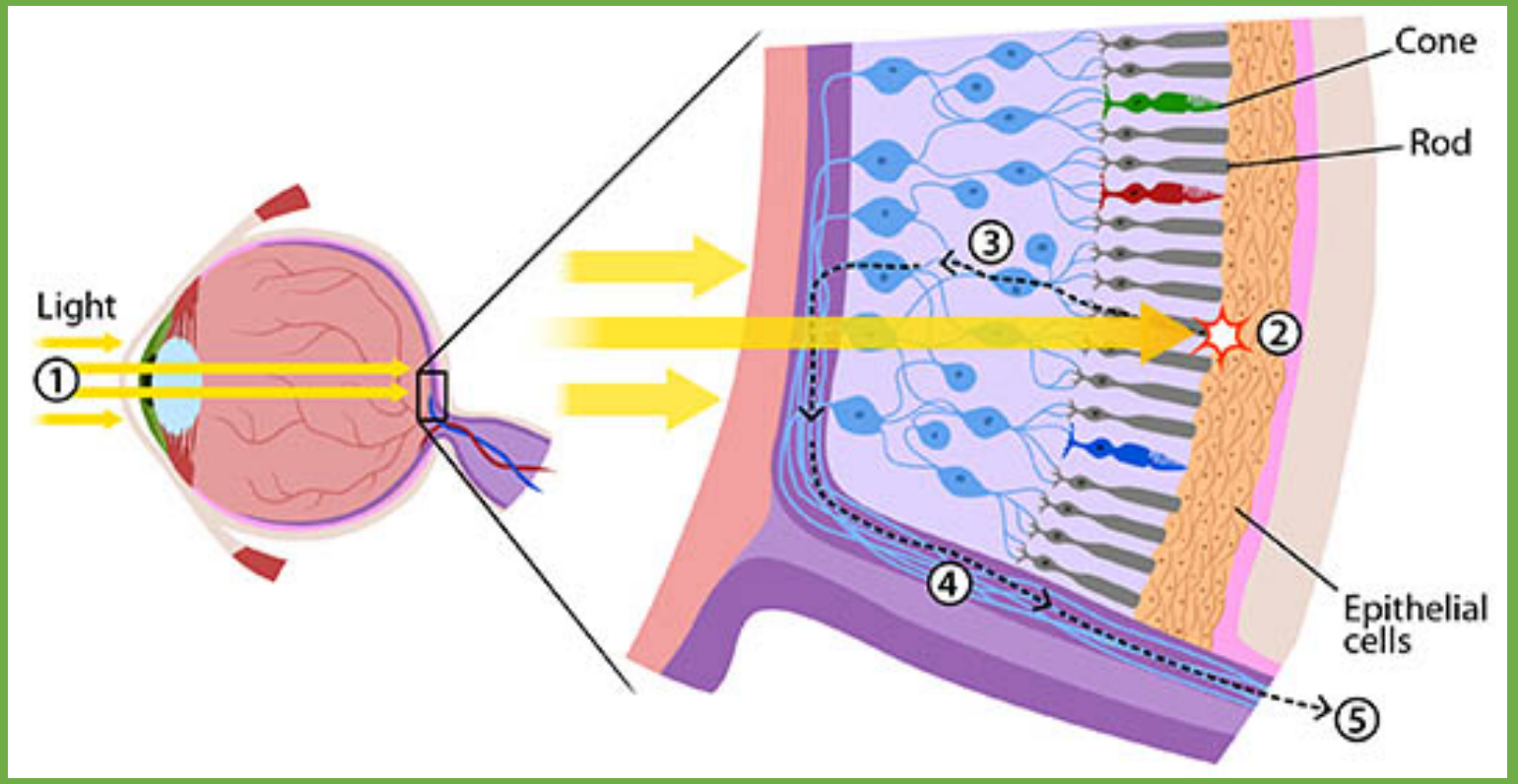
Jimmy Hickey

Color Blindness

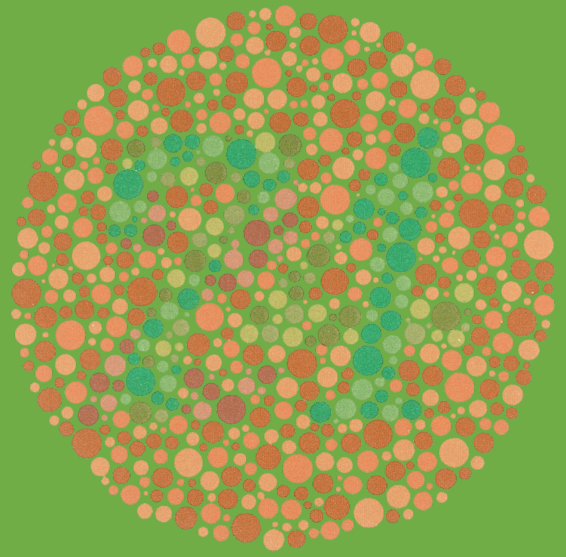
We can still see colors!



https://askabiologist.asu.edu/rods-and-cones



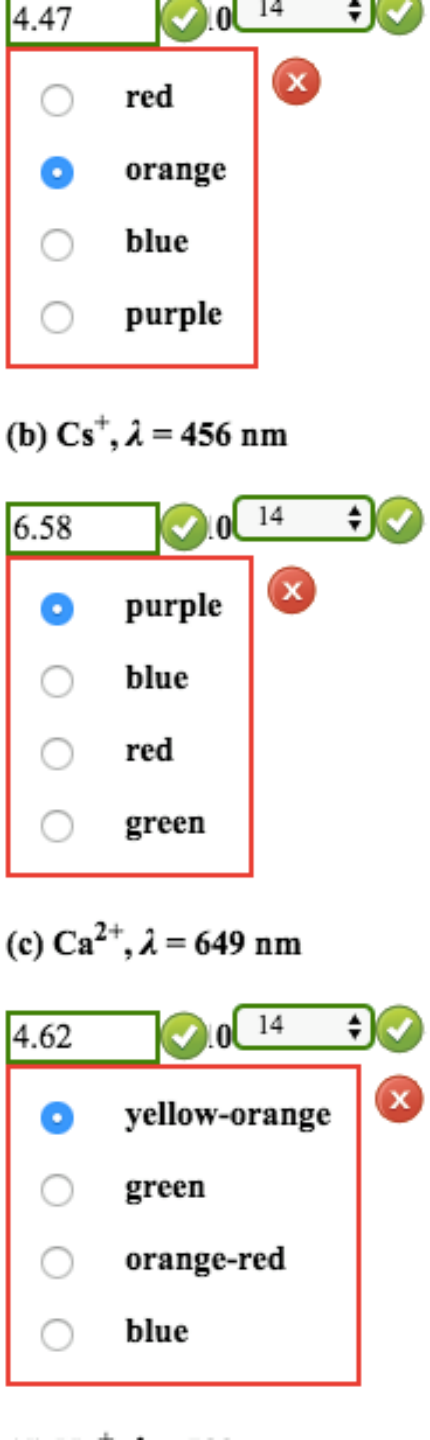
http://hyperphysics.phy-astr.gsu.edu/hbase/vision/colcon.html



https://en.wikipedia.org/wiki/Ishihara_test

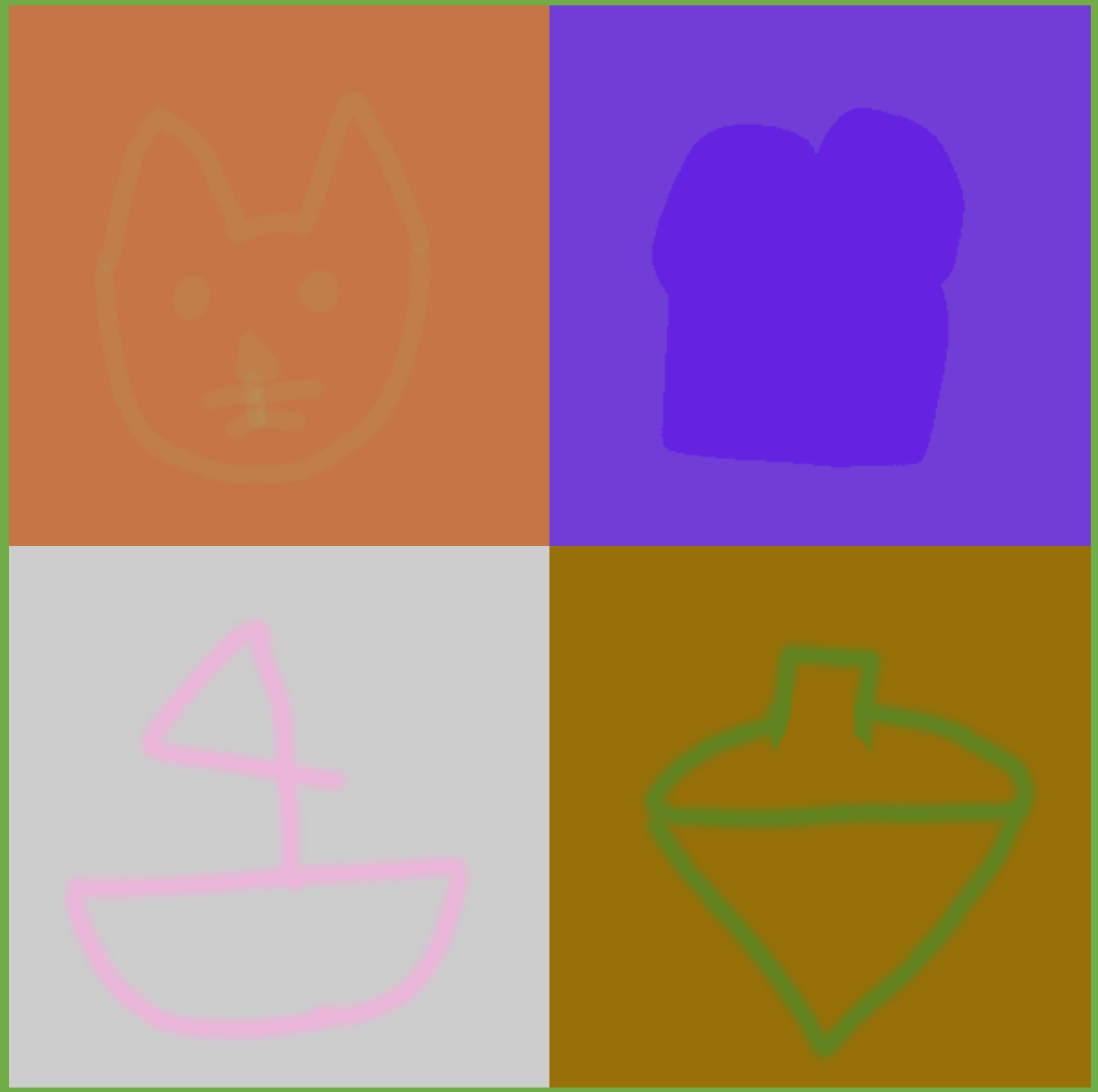
Goals

- Identify colorblind problem areas
- Correct these issues without ruining the image
- Apply the system to any image



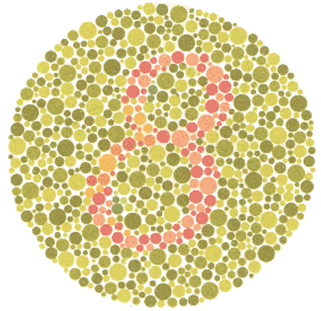
Data Creation

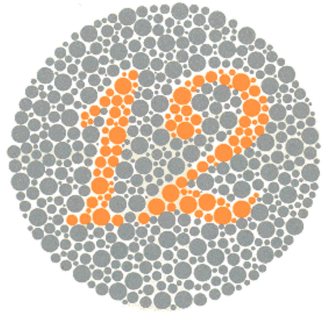
- Data created rather than using Ishihara test
- Drawn using Adobe Photoshop
- Images with many color combinations

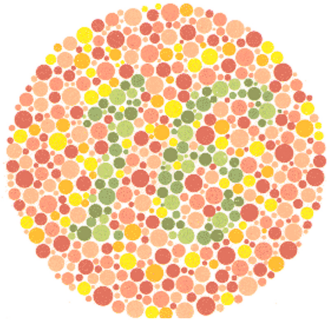


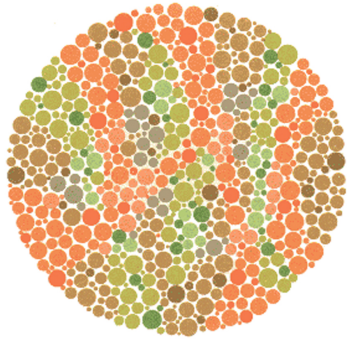
Color Detection

- Unsupervised learning pattern recognition
- Examine RGB value of each pixel in an image
- Learn which combination of values are problematic







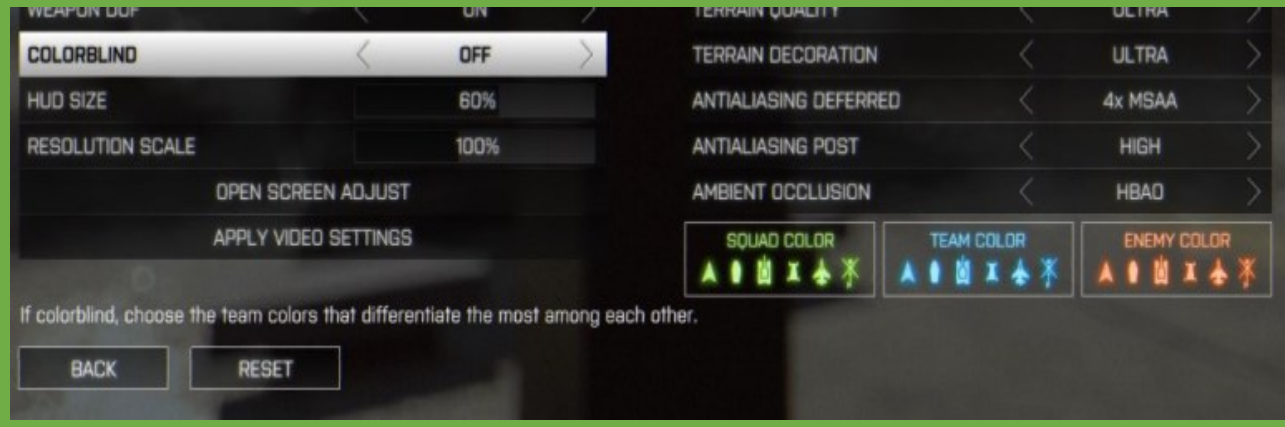


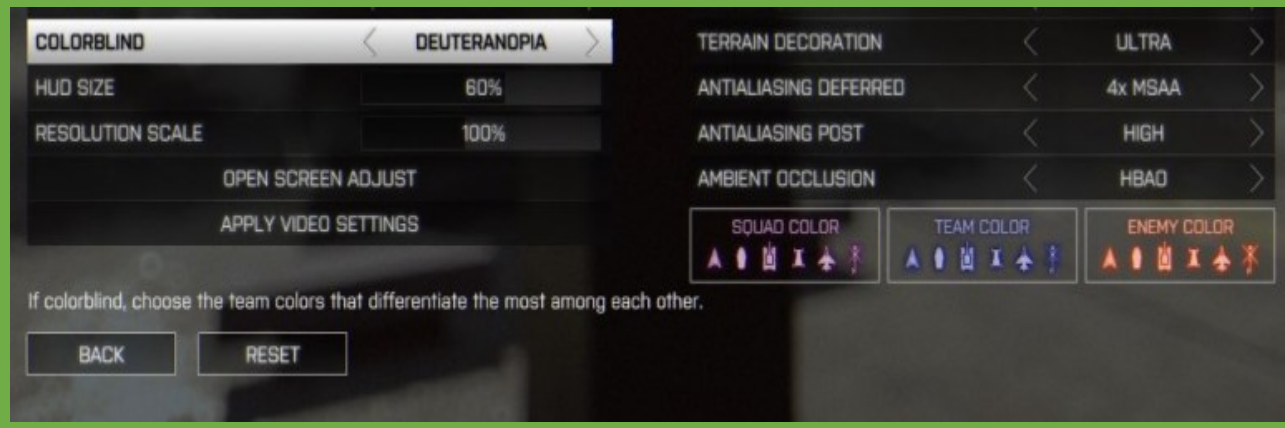
https://chrismarkland.wordpress.com/2012/02/28/map-specific/

Color Correction

- Edge detection
- Color reassignment

https://www.mathworks.com/discovery/edge-detection.html

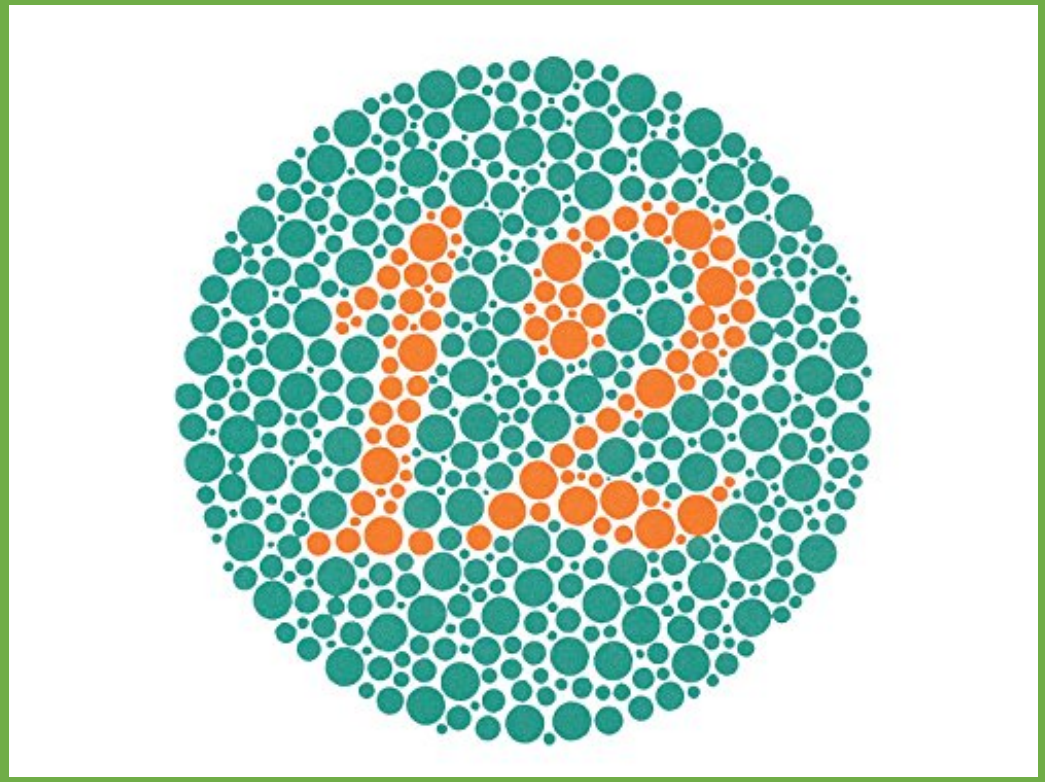




http://www.gamersexperience.com/colorblind-accessibility-in-video-games-is-the-industry-heading-in-the-right-direction/

Flaws and Improvements

- Non-representative data
- No expert opinions
- No user feedback



https://www.amazon.com/KANEHARA-Ishihara-Chart-Deficiency-Plates/dp/B00MAVIR3Y

Typeface

- https://opendyslexic.org/