Palette-based Photo Recoloring Proposal[1]

Overview:

Color manipulation plays a large role in image editing, spanning a wide array of tools in popular image editing software, such as Photoshop. A technique that is largely inaccessible to newcomers is palette-based recoloring, given the complex nature of the process. Common approaches to this recoloring task involve editing histograms, RGB color spaces, and or sliders to determine exposure, lightness, saturation, and other attributes of image color. This project aims to create an interface for palette-based recoloring that intelligently extracts the existing palette of an image and allows the user to replace these values with a new color palette. The quality of the palette recoloring is to be interpreted qualitatively, as well as quantitatively. This requires observing a color transfer technique's quality of interpolation, pixel continuity, palette continuity, and other visual benchmarks. Development environment options include OpenCV and JavaScript (for ease of UI development). Advantages and disadvantages of each option will be further researched and finalized as of the first benchmark (3/4).

Basic Algorithm:

1. K-means clustering of image colors into existing palettes
2. Adjust individual palette colors to their new values using UI
3. Transform original colors to their new values

Schedule:

3/4	Gather additional literature. Establish development environment. Initialize codebase.
3/11	Obtain histogram of original photo.
3/18	Obtain k-means clusters for original photo palette. Generate palette selection options.
3/25	Basic color transfer functionality (using hard-coded values).
4/1	Color Transfer w/ UI integration.
4/8	Retain monotonic luminance during color transfer.
4/15	Monotonic luminance functionality w/ UI integration.
4/22	Acceleration/increase efficiency of transfer task.
4/29	Increase efficiency (continued) / Refine UI.
5/5	Final Project Report. Final Project Demo.

[1] Huiwen Chang, Ohad Fried, Yiming Liu, Stephen DiVerdi, and Adam Finkelstein. Palette-based photo recoloring. Transactions on Graphics, 34(4):139, 2015.