Since the advent of photography practitioners have been searching for process to maximize the detail in their images. The photographic image is inherently a limited representation of our visual reality. Each image sacrifices certain elements to produce a generalized view of the scene.

Photography in its earliest form was a practice in capturing brightness values. It's invention in the 1800's as a Black and White medium was our first semi-permanent (all physical prints fade over time) process to capture our visual existence. Photography democratized the image creation process away from the artist and allows all of us the ability to curate our visual world.

The digitalization of the image created the opportunity to . . The discrete nature limits the dynamic range and compresses the visual relationships.

Overfitting is a major issue with a limited dataset. The best CNN models come from big data. The more images available the better the ability of the model to form a more generalized view of the relationships in the data.

Image issues: Limited size, lighting, exposure, viewpoint, occlusion, background, scale, \dots

My Thesis will focus on lighting and exposure issues.

Maximize the information in the dataset by creating a more generalized representation by training on the full dynamic range of the image.

**Abstract**

Dataset size directly impacts the ability of a Convolutuional Neural Network to learn generalized patterns. A limited dataset in both size and breath generates overfitting in the model. Overfitting is the neural network learning too specificly to the traninging data and not general enough for the scope of test data. Data Augmentation is used to create new training data from a limited dataset. Classical techniques such as flipping, rotating, translating, and transformeing the color channels are ways the data can be augmented while keeping true it's individual categorical label. In this paper I propose a technique utilizing blending modes to highlight features within the dynamic range of the image information. The Multiply and Screen blending modes are used to focus the data on the shadows (dark areas with Multiply) and highlights (light areas with Screen) respectivily. The augmented data is fed into the neural network to create a generalized model. While this model does not reach high levels of accuracy it builds a foundation. On this foundation the unaugmented data is fed into the network to finely tune the model. Results to follow...