

Aperture, ISO and shutter speed detection and classification

The goal of this project is to design a scheme that can detect the aperture, ISO and shutter speed of a given picture. Since these three components are the most important elements to take a good picture. For this project we focus on two kinds of pictures: the portrait photo and landscape photo. For the portrait photo, I want to use the <http://vis-www.cs.umass.edu/lfw/> as my training dataset. For landscape photo, I want to use <https://www.kaggle.com/puneet6060/intel-image-classification> as my training dataset for landscape. I can find the information from EXIF metadata fields to label the aperture, ISO and shutter speed of each training picture.

I want to design this project into a classification problem. For each training picture, I need to find parameters to represent the aperture, parameter to represent the ISO and parameter to represent the shutter speed. Then for each element, I will plot the parameter and use the best clustering technique to classify each picture. I will try to design a neural network to predict these elements. For testing, I will then take portrait photos and landscape photos with different element settings (set aperture, shutter speed to constant and try all different ISO in same condition etc.) to test my trained model.

To quantify the ISO of the pictures, I want to find the Signal-to-noise ratio (SNR) to represent the ISO of the picture. To quantify the aperture of the picture, I want to find the blurriness of the edge of the picture to represent the aperture of the picture. The shutter speed will be represented by the ISO and aperture together.