A Deep Learning Approach to Recognize the Compositional Aspect of Different Lines and Shapes in a Photograph

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by

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Abstract

Images represent the most common form of visual media around us. In contemporary time, with the advancement of imaging technology and the associated devices, the cost of procuring a digital imaging device such as a sensor-based digital camera has become enough affordable. Simultaneously, the availability of high-resolution cameras embedded with mobile devices has also made photography one of the most practiced hobbies in recent times. As a result, the cyberspace now contains millions of images shot by different devices worldwide. Every year contests are held both online and offline, where participants are judged for their images' aesthetic quality. However, manual judgement by an expert too can be subject to human perception bias. At the same time, given a large number of entries for a photography contest, human level judging may result in perceptual errors and high result turnaround time.

In most studies of research involving digital photographs and a subsequent attempt to classify them into non-overlapping sets of being visually appealing or not, few common features have been utilized. Those are colour pallet, texture, noise, sharpness, contrast, distortion, lateral chromatic aberration, and exposure accuracy, among many other. Some systems also have considered sub-problems of photographs adhering to basic composition rules such as the Rule of thirds and the golden ratio. Interestingly, systems that have included composition rules have only partially utilized the set of actual rules.

This thesis studies about the compositional aspects of different lines and shape of objects in photographs which play an important role in aesthetic evaluation. These compositional features are of different types; it may be Diagonal line, Leading line and Shape of object.

There is a term "Aesthetic" in the art of photography which means the philosophy of beauty. In the field of art and photography, it relates to the artistic choice and appreciation of artistry. Computational assessment of aesthetic appeal of photographs is a highly idiosyncratic job. Because of this lot of researchers are interested in this area in present days. It is an interdisciplinary area related to computer vision, art and psychology. Since there is no universal standard for evaluation of aesthetic value, hence many common viewer believe that some certain features of a photograph play a vital role to make a photograph aesthetically pleasant. This thesis includes a survey on a systematic audit of the newfangled techniques and compositions for the evaluation of aesthetic quality of photographs. The existing studies reveal that aesthetic quality of photographs depend on the compositional rules like Rule of Third, Golden ratio, Depth of field, and the colour space features such as hue, saturation and texture.

In this thesis, also I have implemented a deep learning approach by applying Convolutional Neural Network (CNN) to recognize the compositions of different lines and shapes of objects in photographs. I have developed different photo classifiers using Deep Convolutional Neural Network (DCNN) architecture based on various compositions like, Leading line, Diagonal line and Geometrical shapes of objects.