

Chapter 9

Aesthetic Composition Indicator Based on Image Complexity

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ABSTRACT

Several systems and indicators for multimedia devices have appeared in recent years, with the goal of helping the final user to achieve better results. Said indicators aim at facilitating beginner and intermediate photographers in the creation of images or videos with more professional aesthetics. The chapter describes a series of metrics related to complexity which seem to be useful for the purpose of assessing the aesthetic composition of an image. All the presented metrics are fundamental parts of the prototype “ACIC” introduced here, which allows an assessment of the aesthetics in the composition of the various frames integrating a video.

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INTRODUCTION

From image brightness indicators to facial recognition systems, multimedia devices in the home and commercial environments have gone through a revolution from the late 90s until the present day. These systems allow access to the images intrinsic information based on different phenomena, such as contrast, for instance, showing whether there is an under or over exposure at a given time.

Most of these indicators have the task of measuring objective phenomena, given that they can be clearly identifiable and quantified. Any system, which could be capable of measuring a relevant subjective phenomenon related to taking a picture or shooting a video would possess a high added value.

This paper proposes a system allowing the evaluation of the aesthetic composition of an image or the frames in a video (Liu, Chen, Wolf, & Cohen-Or, 2010). Thus, multimedia devices could help the user to identify in real time those framings with a certain aesthetic value. This would enable users without artistic background to take pictures and shoot videos of better appearance and with a more professional look.

Numerous papers (Machado & Cardoso, 2002; Rigau, Freixas, & Sbert, 2008; Ross, Ralph, & Zong, 2006; Machado, Romero, & Manaris, 2007) have appeared in recent years evaluating different elements of the aesthetic value of images and different ways to estimate it. This chapter introduces different metrics based on those works, based on the complexity of an image, which have already proven useful in experiments related to the ordering and classification based on stylistic and aesthetic criteria (Romero, Machado, Carballal, & Osorio, 2011; Machado, Romero, Nadal, Santos, Correia, & Carballal, 2015).

First, we will make a study of those metrics and their usefulness for calculating the aesthetic composition of a landscape. An experiment of image binary classification according to their aesthetic composition will be described for this purpose. Later on, we will present the design of a prototype system indicating the aesthetic composition of the frames integrating a video: **Aesthetic Composition Indicator based-on Image Complexity** (a.k.a **ACIC**). This system will be used for the purpose of differentiating professional and amateur videos. Similarly, an example of functioning will be provided based on a professional video and the comments made by an expert on the results achieved.

We understand that the resulting prototype can be used for several tasks related to aesthetic composition: identification, classification, categorization, etc.; both in real-time multimedia devices and in stand-alone applications.

Next, the present paper is structured as follows: (i) a short description of the state of the art in composition systems is included; (ii) the hypothesis of the authors about possible metrics for evaluating the aesthetic composition of an image is presented; (iii) the features to be used in the study are described; (iv) the results obtained in an experiment of image classification according to their aesthetic composition are shown; (v) the design and functioning of a prototype will be detailed by means of a real example; (vi) and, finally, the conclusions and the upcoming research lines for improving the already presented prototype will be explained.

STATE OF THE ART

Santella, Agrawala, DeCarlo, Salesin, & Cohen (2006) presented a system which records user's eye movements for a few seconds to identify important image content. The given approach is capable of generate crops of any size or aspect ratio. The main disadvantage is that the system incurs on requiring user input, so it can't be considered a fully-computational approach. Once the important area of an image

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