Hipster Wars: Discovering Elements of Fashion Styles

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Abstract. The clothing we wear and our identities are closely tied, revealing to the world clues about our wealth, occupation, and socio-identity. In this paper we examine questions related to what our clothing reveals about our personal style. We first design an online competitive Style Rating Game called Hipster Wars to crowd source reliable human judgments of style. We use this game to collect a new dataset of clothing outfits with associated style ratings for 5 style categories: hipster, bohemian, pinup, preppy, and goth. Next, we train models for between-class and within-class classification of styles. Finally, we explore methods to identify clothing elements that are generally discriminative for a style, and methods for identifying items in a particular outfit that may indicate a style.

1 Introduction

To me, clothing is a form of self-expression - there are hints about who you are in what you wear. – Marc Jacobs, fashion designer.

Clothing reveals information about its wearer’s socio-identity, including hints about their wealth, occupation, religion, location, and social status. In this paper, we consider what clothing reveals about personal style, in particular focusing on recognizing styles of dress such as hipster, goth, or preppy. Personal style is closely tied to both how you perceive yourself, and how your identity is perceived by other people. At a broader level it even reflects and/or influences the people with whom you tend to interact and associate. We believe this makes it an important problem for consideration because it relates to improving our understanding and knowledge of human socio-identity. And, because clothing styles are generally composed of visual elements, computational vision techniques are the best avenue for automated exploration at a large scale.

Additionally, there are many potential research and commercial applications of style recognition. Imagine a billboard that could tailor which advertisements to show you as you walk by, based on what you’re wearing. Another obvious application is personalized online shopping suggestions for clothing or other products. The annual revenue for online shopping alone totals over $200 Billion.
dollars annually [33], making this a growing industry for automatic applications of computer vision. At a higher level, recognizing aspects of identity could be used in recommendation systems for compatible matches on dating and other social networks.

Toward efforts on style recognition, we first collect a new style dataset. The dataset consists of 1893 images depicting five different fashion styles – bohemian, goth, hipster, pinup, and preppy. For each image we want to identify not only which style is reflected, but also how strongly the style is displayed, e.g. is this person an uber hipster or only somewhat hipster. Since direct rating based measures (e.g. asking a person to rate the style from 1 to 10) often produce unstable scores (see Fig. 4), we designed Hipster Wars (www.hipsterwars.com), a new tournament based rating game to crowd source reliable style ratings across a large number of people. Hipster Wars presents a user with two images and asks, for example, which image is more hipster? A ranking algorithm is used to progressively determine style ratings based on user clicks, and to match up images with similar ratings to produce more accurate and fine-detailed scores efficiently. Our game was released to great success, attracting over 1700 users who provided over 30,000 votes at the time of submission. The number of users is growing every day.

Next, we perform a number of experiments on our new dataset related to style recognition. The first set of experiments explore multi-class classification between styles, e.g. which style does an image depict, hipster, goth, pinup, preppy, or bohemian (Sec 5.1). Next we look at within class classification (Sec 5.2). Here we want to identify the degree to which a style is exhibited, the main motivation for collecting the pairwise comparisons using Hipster Wars.

We also attempt to automatically identify which elements of clothing are associated with each style (Sec 6). This goal involves both exploring methods to identify clothing elements that are generally discriminative for a style, and methods for identifying items in a particular outfit that may indicate a style.

Though an exciting problem, style recognition has not been explored much to date in the computer vision community. Problems related to style in general have been explored in recent work on recognizing distinctive visual elements of cities [7] or cars [20]. More closely related to this paper, some work attempts recognizing urban tribes in group photos of people at different social events [25,17]. In that work, style recognition is treated as a multi-class classification problem where the goal is to predict which of k styles is depicted by a group of people. We take these efforts in a new direction by making use of state-of-the-art methods for clothing recognition to recognize style based only on the clothing that an individual person is wearing. Additionally, we examine two new problems: recognizing the strength of style depicted (e.g. how hipster is this person?), and recognizing which elements of clothing influence perception of style (e.g. which outfit items indicate that this person is a hipster?).

In summary, the main contributions of our paper are:

1. An online competitive Rating Game to collectively compute style ratings based on human judgments.