Horizon 2020

fashion BRAIN project

Understanding Europe's Fashion Data Universe

Scalable Crowdsourced Social Media Annotation

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Deliverable Description

This deliverable consists of a publicly available website with data visualization functionality. We demonstrate that we analyzed hundreds of fashion blogs, Instagram profiles and that we are able to constantly update the profiles with recently published images.

Abstract

This deliverable consists of a publicly available website with data visualization functionality. We demonstrate that we analyzed hundreds of fashion blogs, Instagram profiles and that we are able to constantly update the profiles with recently published images.

We present the dataset that we collected for this deliverable and provide some basic statistics on it.

We outline the two main ways on how the fashion products are annotated: automatic annotation by our machine learning algorithm and refinement of these automatic annotation by using crowdsourcing. For both of these approaches we argue some benefits and drawbacks.

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List of Acronyms and Abbreviations

GDPR   General Data Protection Regulations

WP   Work Package

1 Introduction

Social media, image sharing platforms and bloggers have transformed the entire
fashion discovery journey. Which fashion product is popular, trendy and a best-
seller is defined by its presence on social media. Fashion bloggers are used by
brands to distribute and influence this process. Bloggers are getting paid by brands
and retailers to wear a specific product because they have a significant reach on the
relevant social media platforms. In this deliverable we crawled 100 fashion blogger
accounts from Instagram and identified all fashion products in the images. The
images including the annotated products have been made available to the public on
a demonstration website.

1.1 Scope of this Deliverable

Scope This deliverable presents a scalable way for annotating fashion products in
social media images.

Dependencies Machine learning algorithm that is used to annotate fashion
products is presented in deliverable D6.2. Crowdsourcing solution that is used
to refine the products annotations are presented in Deliverable 3.1.

Contribution This deliverable will contribute to task T5.2, where we will use the
same dataset to extract attributes of the annotated fashion products.

Collaborations The dataset which resulted from this deliverable was given to
University of Fribourg for their research on fashion trend prediction.

Datasets In this deliverable we collect a dataset of 100 Instagram fashion
influencers. For each influencer we download 100 images, which results in
a dataset with around 11,000 images.

2 Demonstration website

The demonstration website (https://fashionbrain-project.eu/scalable-crowdsourced-social-media-annotation-demo) displays the images from the collected Instagram dataset. The annotated products can be seen by clicking on an image. The screenshot in Figure 2.1 shows the layout of the website.
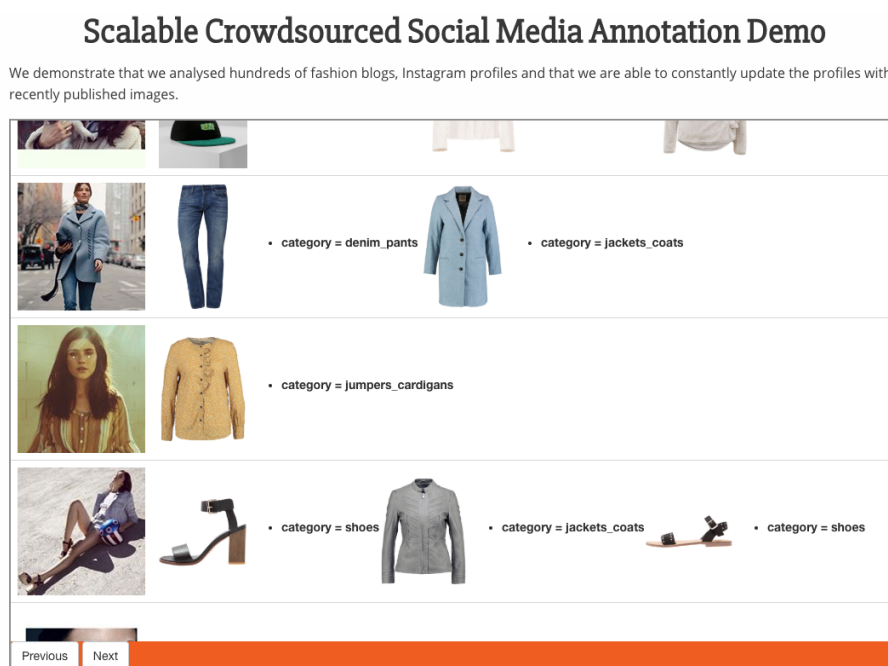
Figure 2.1: Screenshot of the publicly available website that shows the collected fashion blogger images and annotated products in these images.

The novel website demo is compliant with the General Data Protection Regulations (GDPR)[1]. For example, the consortium does not host these Instagram images, but they are served by Instagram directly. More specifically, we follow Article 17 of GDPR [1], which concerns the user's rights to data erasure. This means if a user chooses to delete his/her data from Instagram, it will also be automatically deleted from this demonstration website.

Moreover, a Consent Manager[2] has been introduced, to allow influencers to withdraw consent, should they wish to do so.

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[1] We refer to Deliverable D9.3 for more information.

[2] https://fashionbrain-project.eu/data-ethics-and-privacy, see Deliverable D9.2 and D9.3 for more information.

3 Data

For this WP we downloaded around 100 images from 100 Instagram bloggers, which resulted in a total of 11'007 images. This list of the Instagram fashion influencers have been the output of the deliverable D6.3. The Instagram API [2] has been used to download the images, as well as the corresponding metadata like number of likes, comments and title. Some statistics about the images processed are shown below. An image classification algorithm has been used to analyze the content of the images.

Figure 3.1 shows number of products per fashion category in the collected images. The most common category of products detected in the images were denim pants and jackets and coats. Less popular categories were scarves, wraps and socks. A number of categories sat midway in popularity such as bags, eyewear and shoes.
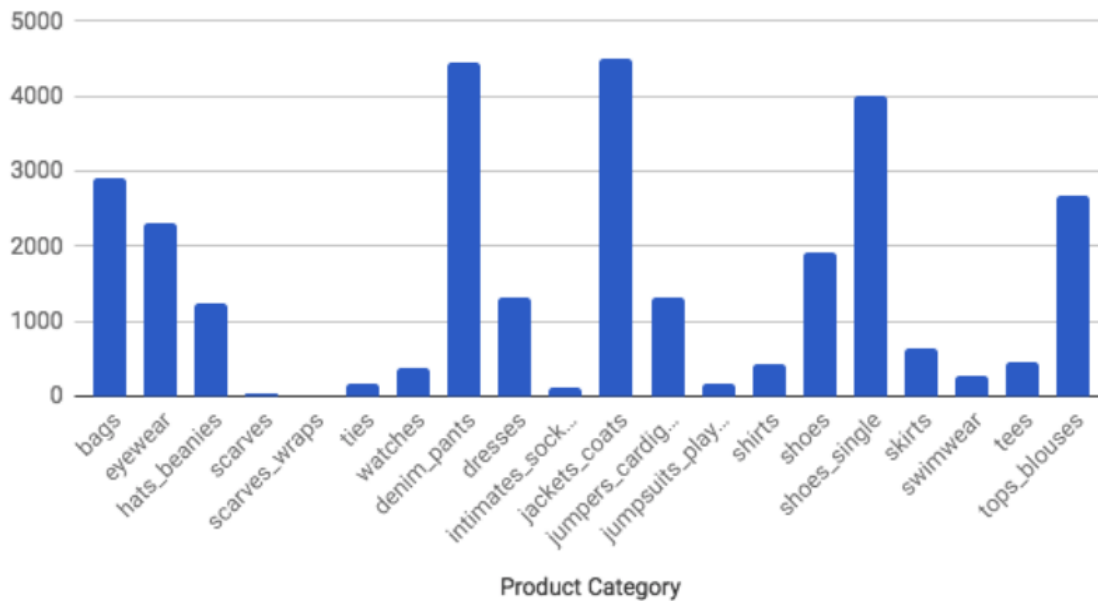
**Figure 3.1:** Number of products per category.

Figure 3.2 shows number of detected products per image. Most images had between 1 and 4 products detected, with very few images having more than 6 products. Some images did not have any products detected, and this is due to the use of other post types such a text only posts (motivation quotes) or nature shots.

Figure 3.3 shows the analysis of the style of collected image by Fashwell's proprietary image classification algorithm. The vast majority of images were detected as "real"
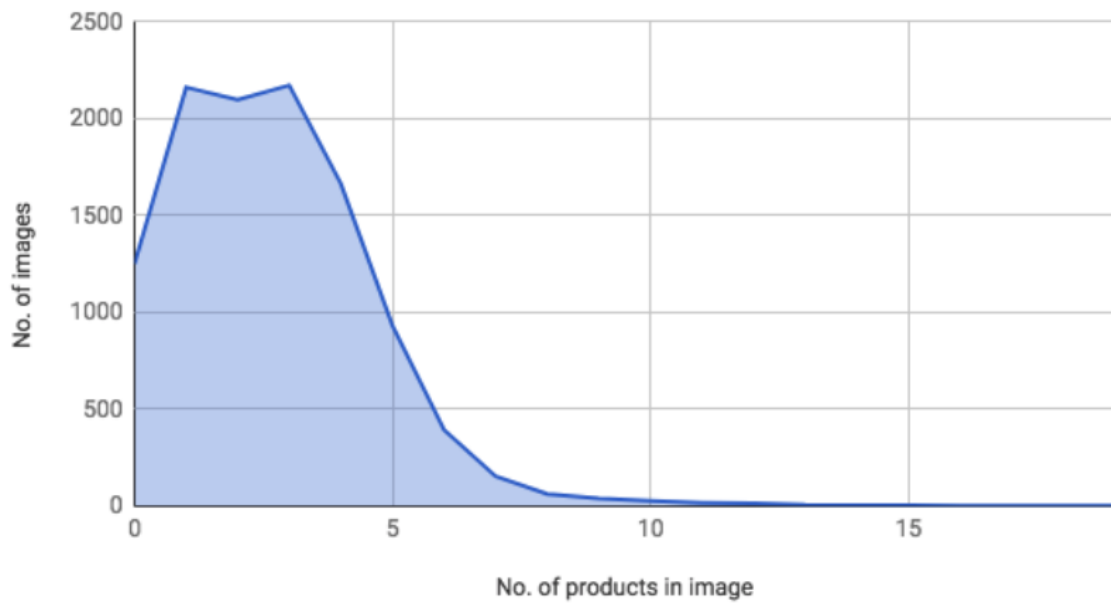
Figure 3.2: Number of products per image.

images, indicating an image with a non-studio background. The next most detected photographic style was detail shots, indicating an image that does not include all of the product, but only a detail of it. Clean shot images represent full product pictures - these were the least common.
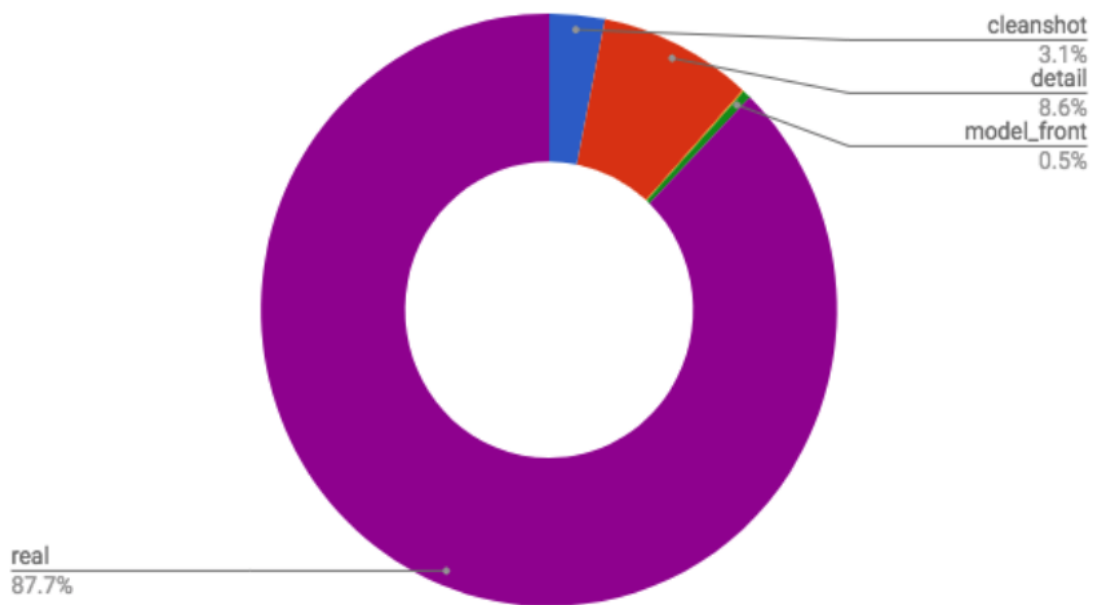
Figure 3.3: Image style.

4 Annotation

In this section, Fashwell quickly reviews the work presented in Deliverable 6.2 and Deliverable 3.1 and shows how the work developed in these two WP contributed to this deliverable. All 11007 fashion blogger images have been linked/annotated with the most similar products of the product database. The annotation process can be divided into two different tasks:

- the automatic annotation
- refinement of automatic annotation using crowdsourcing

The automatic annotation takes advantage of state of the art computer vision and deep learning to find the most similar products in the database. The second task leverages the wisdom of the crowd to refine and verify the automatic annotation.

4.1 Automatic annotation

In the Deliverable 6.2, we presented our work in the FashionBrain project in correspondence to the task of named entity linking using computer vision and machine learning. The presented approach outperforms all publicly available methods on the academic benchmark presented in (Liu et al. 2016 [3]) (details about the experiment can be found in D6.2).

The conceptual idea behind our method is to understand an embedding space where visually similar products are close to each other, whereas visually dissimilar products are further apart. Visual similarity can be described with many different features of a product such as the category, color, pattern, neck type, sleeve length, etc.

The presented approach localizes different fashion objects in the fashion blogger image and 'projects' the relevant product image patch into the embedding space. The Euclidean distance in that embedding space is used to describe the similarity - more similar products are close to each other, and vice versa. Fashwell's approach outperforms current state-of-the-art methods, but there are still areas to improve. An example result of the methods can be found in Figure 4.1.
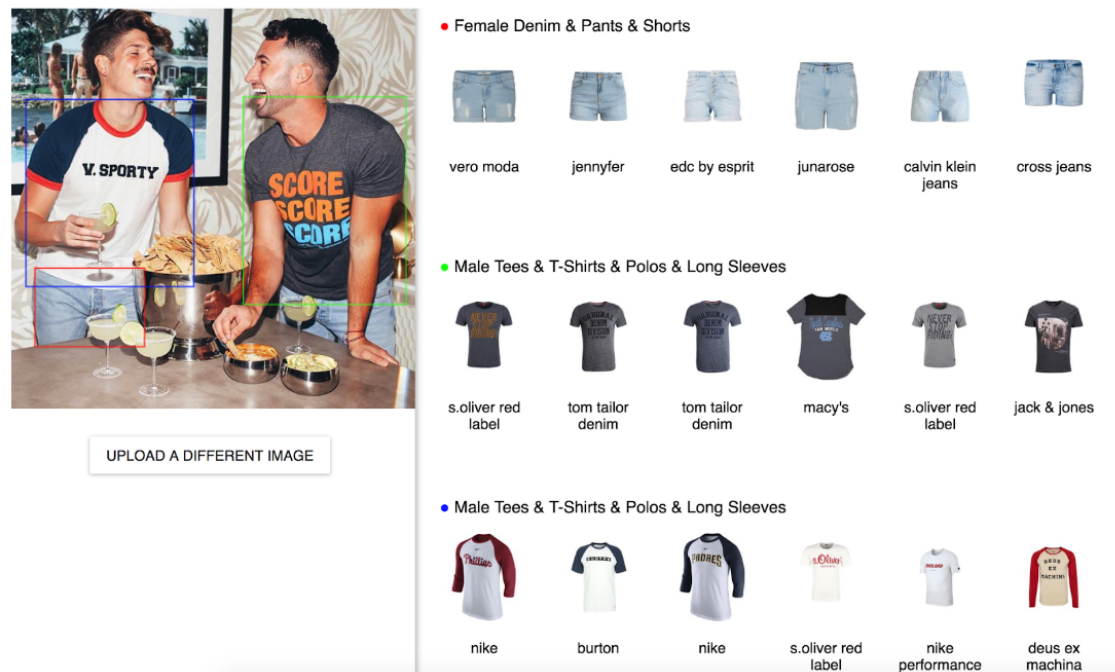
Figure 4.1: An example result of automatic annotation.

4.2 Annotation refinement with crowdsourcing

Since the automatic annotation approach is not perfect, we built an online tool where workers around the world could help us verify and improve the annotations. The design and concept of crowdsourcing refinement tool has already been discussed in the WP3.

A screenshot of the tool is shown in Figure. The tool starts with the automatic results of named entity linking approach and uses computer vision and deep learning to quickly improve the annotations.

On average, a worker needs around 2 minutes to annotate an image perfectly. The time highly depends on the number of products in an image and on the image quality. The workers have been hired using a freelancing platform [4].
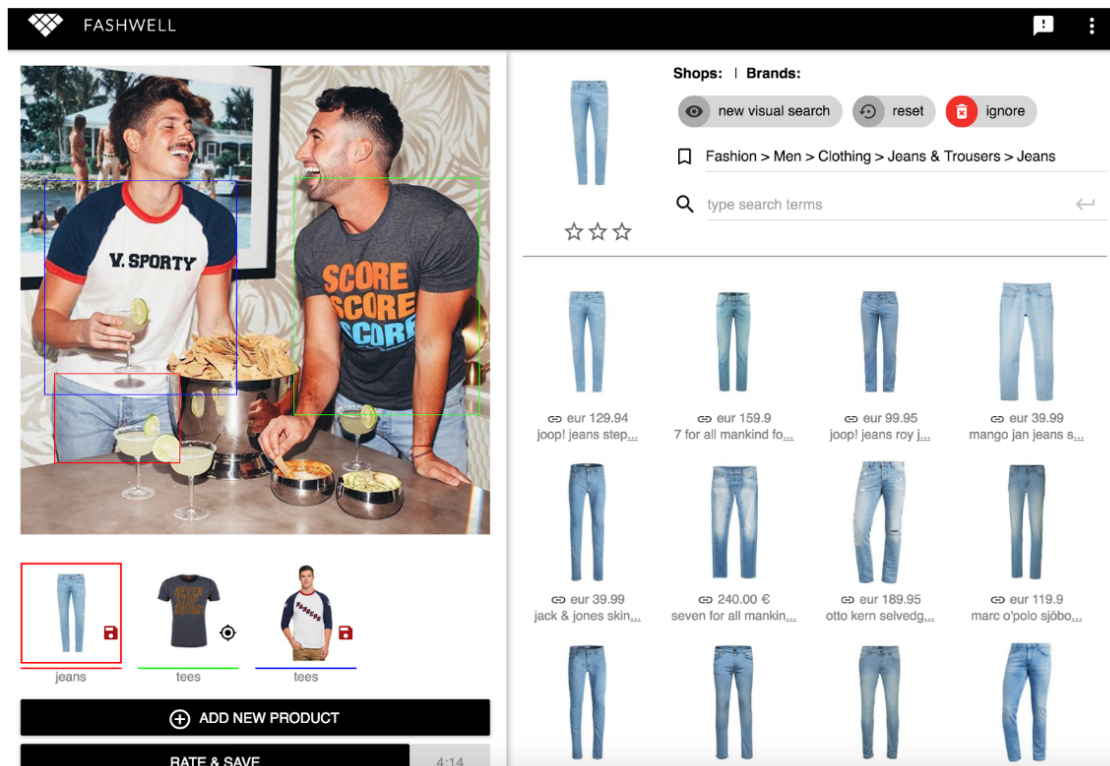
Figure 4.2: An example of annotation refinement using crowdsourcing.

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