

SpiritTagger: A Location-Aware Interactive Web Tool for Annotating Your Photo Collection

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ABSTRACT

Digital photos are an important aspect of the modern multimedia experience. The contributions of online collaborative communities can now be leveraged for the task of automated image annotation. We present a web tool, SpiritTagger, which suggests tags for a user's photo provided the location where it was taken. We accomplish this on a world scale by mining data from nearly 1.5 million geo-referenced images from the website Flickr. By applying statistics on the geographic distribution of tags, we can bias towards suggesting ones that occur more often locally, hence capturing the spirit or *genius loci*, of the place.

Categories and Subject Descriptors

H.3.3 [Information Storage and Retrieval]: Information Search and Retrieval – *information filtering, retrieval model*.

Keywords

Geo-referenced image annotation

1. INTRODUCTION

Digital photos are an important aspect of modern multimedia. We share our experiences in the world with others via photographs, and the twofold nature of pictorial experience may influence our understanding of the world [1]. The manner in which we share our photos is rapidly changing. Film slides and projectors have been replaced by digital images stored and displayed on social networking sites. A shoebox crammed full of hundreds of prints has been substituted with a hard drive containing tens of thousands of digital image representations. With these changes, computing can now be used in innovative ways to organize digital repositories which in turn helps people share their view of the world.

Annotation suggestion is one area where algorithms can aid users. Labeling photos via typing is a tedious process which can be mediated by offering the user a choice of relevant suggestions easily selected via a mouse click. However, automatic image annotation based on content analysis alone still offers unsatisfactory solutions for broad domains. SpiritTagger is a system which attempts to offer more appropriate labels than other state-of-the-art methods [2]. The tool finds better labels by combining image content analysis with additional information mined from location-based meta-data in online collaborative

photo collections, like Flickr. When a user presents a photo along with a GPS coordinate indicating where it was taken, SpiritTagger suggests labels commonly used in that geographic area with similar photos. We are more likely to offer labels which occur more frequently regionally than globally. This additional consideration reflects the view that the labels capture the *genius loci*, a term spatially analogous to *zeitgeist* meaning the spirit of a place. These terms are more beneficial to the user. The name SpiritTagger derives from this motivation of capturing the spirit of a geographic location.

2. SYSTEM METHODOLOGY

We present an online web demo which suggests labels for user photos. The system uses data based on approximately 1.5 million geo-referenced photographs crawled globally via the Flickr API [3]. The tool works as follows. First, a user can provide an image by uploading from a local hard drive or by providing a URL. Using a set of features extracted from the image, an initial estimate of where the photograph was taken in the world is provided by centering a Google map interface on the location (see Figure 1).

The user adjusts the map to mark the correct location of where the photograph was taken. A new page then loads which offers label suggestions from SpiritTagger and presents a set of similar and nearby images (see Figure 2). The suggestions are words that are considered not only regionally relevant but also visually relevant as derived from a set of computer vision visual features.

The user can add labels to their image by clicking on suggestions they find relevant or by typing in their own labels. Finally, the user can click to submit their photo to an online photo sharing site such as Flickr or Picasa. In order to understand the effectiveness of the suggestions provided by SpiritTagger, we log which of the suggested labels are applied to the input photographs.

SpiritTagger explores a method for mining an online collaborative community for learning information pertinent to photographs taken around the world. While many computer vision researchers have avoided using this type of data due to concerns about its signal-to-noise ratio, we feel that due to the sheer amount of information freely available collaborative communities should not be ignored as a source for solutions to open computer vision problems [4]. Furthermore, the mass of continuously growing and updated data allows a very dynamic and relevant understanding of the world. By intelligently considering when

signal can be discovered amidst the noisy labels present in the long tail of its power law distribution [5], we attempt to contribute a robust system for mining previously undiscovered knowledge about world images. More information on the technical details used in the tag suggestion can be found in our work at [6].

3. ACKNOWLEDGMENTS

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4. REFERENCES

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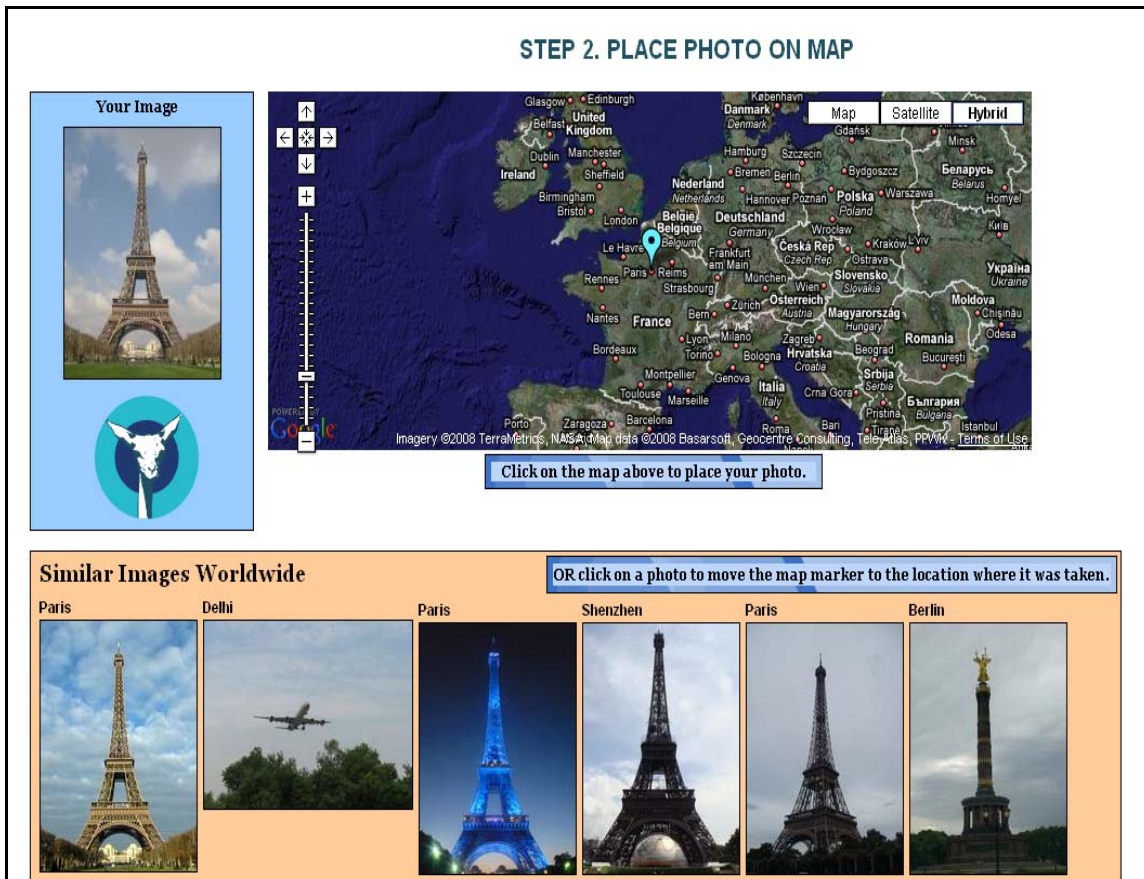




Figure 1 This webpage provides an interface for users to indicate where the photo was taken. An estimate based on similar images in the database is provided. In this example, an image of the Eiffel Tower has been uploaded, and a crude search of the database finds other visually similar photos that suggest Paris as the location of the photo. This geocoordinate is initialized and the user is allowed to refine or change the estimate before tags are suggested.

STEP 3. SELECT TAGS





[paris](#) [france](#) [europe](#) [Eiffel Tower](#) [Eiffel](#) [Tour Eiffel](#) [tour](#) [2008](#) [torre](#) [francia](#) [night](#) [tower](#) [blue](#) [Bleu](#) [Europa](#) [parigi](#) [holiday](#) [grass](#) [view](#) [vacanze](#)


[Submit Photo](#)

Click to add relevant labels to photo:

[paris](#) · [france](#) · [europe](#) · [Eiffel Tower](#) · [Eiffel](#) · [Tour Eiffel](#) · [tour](#) · [2008](#) · [torre](#) · [francia](#) · [night](#) · [tower](#) · [blue](#) · [Bleu](#) · [Europa](#) · [parigi](#) · [holiday](#) · [grass](#) · [view](#) · [vacanze](#)


Visually Similar Photos

A




[Europa](#) [2008](#)

B




[paris](#) [france](#) [Eiffel](#) [Tower](#) [Rain](#) [night](#) [blue](#) [light](#)

C

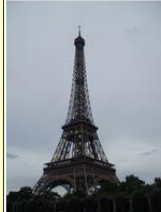


[england](#)


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Figure 2 This webpage allows users to select relevant tags suggested by SpiritTagger. Users can also browse visually similar and nearby photos. In this example, the Eiffel Tower image and geocoordinate have been used to find other visually similar photos in the same geographic area, and the associated tags have been mined for geographically relevant terms that are suggested at the top of the page. The tags highlighted in the box at the top have been judged relevant by the user and can be uploaded with the photo to a photo sharing website.