

# GuideCam: A Digital Camera with Picture Spot Finder

Chiho Watanabe<sup>1</sup>, Koji Tsukada<sup>2</sup>, Takayuki Goto<sup>3</sup>, Itiro Siio<sup>1</sup>,

<sup>1</sup> Graduate School of Humanities and Sciences, Ochanomizu University, Tokyo, Japan

<sup>2</sup> Ochadai Academic Production, Ochanomizu University, Tokyo, Japan

PRESTO Japan Science and Technology Agency (JST), Saitama, Japan

<sup>3</sup> The Graduate University for Advanced Studies, Tokyo, Japan

watanabe.chiho@is.ocha.ac.jp, {tsuka, siio}@acm.org

**Abstract.** We propose a smart digital camera called “GuideCam” that supports tourists taking pictures during their trips. GuideCam can extract picture spots from an online picture database (e.g., Flickr) and show these spots to tourists in a timely manner. Thus, the tourists can easily take pictures at popular picture spots located around them. Moreover, our system also helps tourists upload pictures to the online picture database.

**Keywords:** Digital camera, picture spot, online picture sharing, tourist

## 1 Introduction

Many tourists like taking pictures when they visit popular sites during their trips. However, tourists often have difficulty finding these picture spots since they usually do not have sufficient knowledge of surrounding areas while travelling. However, there are some picture-spot signs in theme parks. For example, Kodak Photo Spots<sup>1</sup> are placed in Disney World for indicating spots from where users can take attractive pictures. The basic idea of our research is to extend these picture-spot signs to various places in a practical way. We propose a smart digital camera called “GuideCam”, which can extract picture spots from online picture database, and show these spots to tourists in a timely manner.

## 2 GuideCam

The basic concepts behind the GuideCam are as follows:

1. Extracting picture spots from online picture databases
2. Presenting nearby picture spots to the user
3. Uploading captured pictures easily to the database

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<sup>1</sup> [http://en.wikipedia.org/wiki/Kodak\\_Photo\\_Spot](http://en.wikipedia.org/wiki/Kodak_Photo_Spot)

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**Fig. 1.** The GuideCam concept

First, GuideCam extracts picture spots from online picture databases. We selected Flickr<sup>2</sup> as the picture database for the prototype as it contains a large number of public pictures with location information (latitude and longitude). We assumed places around which many pictures are taken to be likely picture spots. The algorithm is explained in detail in the next section.

Second, GuideCam presents picture spots based on the location of the user. When picture spots are found around the user, the system activates a vibrator to indicate the proximity of picture spots to the user. Next, he/she can check detailed information of the picture spots (e.g., sample pictures and map location) on the GuideCam display.

Third, GuideCam helps a user quickly upload captured pictures to Flickr. This function may improve the quality and size of the picture database for future use.

### 3 Implementation

We developed the GuideCam prototype on the iPhone platform. The GuideCam utilizes built-in devices in the iPhone, such as a GPS, a vibrator, a touch panel display, and a camera. The operation of the GuideCam system (Fig. 2) is as follows:

- 1 The system detects a user's location using a GPS.
- 2 The system searches for pictures around the location through geo-tagged pictures taken within a certain period on Flickr. In the current prototype, we assumed the target area to be within a 4-km radius in consideration of pedestrian accessibility, and the target period was set at two years as pictures are taken continuously in most popular picture spots.
- 3 The system extracts picture spots from these pictures as follows:
  - 3.1 The system divides the target area into 10-by-10 blocks and categorizes each picture based on its location block.
  - 3.2 The system counts picture numbers in each block.

<sup>2</sup> <http://flickr.com/>

- 3.3 The system defines a block with a certain number of pictures as a picture spot candidate. The threshold is changed in proportion to total picture numbers.
- 3.4 When pictures in a picture spot candidate are taken continuously through the target period, the system determines it to be a picture spot.
- 4 When picture spots are found around the user, the system activates a vibrator to indicate the proximity of picture spots to the user
- 5 The user can check picture spots on the map and browse ample pictures taken in each spot as shown in Fig. 3.
- 6 When the user arrives at the destination, he/she can easily take a picture by pushing the snap button shown in Fig. 3. The picture is automatically uploaded to Flickr with location information.



**Fig. 2.** Operation of GuideCam



**Fig. 3.** Screenshot of GuideCam

## 4 Related Work

There are several research projects which have proposed novel digital cameras. SenseCam [1] is a wearable camera to record pictures of daily activities periodically. WillCam [2] is a digital camera, which enables users to capture various information, such as location, temperature, ambient noise, and facial expression of the photographer, in addition to the picture itself. The social camera [3] supports users in composing a scene by providing relevant compositions based on their current location and scene context. There are several web services which aid people in adding/using tags. ZoneTag [4] supports picture annotation via context-based tag suggestions. TagMaps [5] is a toolkit to visualize tags geographically on a map.

Meanwhile, our approach is unique in extracting picture spots around a user from geo-tagged pictures on Flickr.



**Fig. 4.** Example picture spots extracted by GuideCam in Ylivieska, Finland

## 5 Conclusion

We have developed a smart digital camera, GuideCam, which supports tourists in taking pictures during their trips. GuideCam can extract picture spots from online picture databases (e.g., Flickr) and show these spots to tourists in a timely manner. Thus, the tourists can easily take popular pictures at the picture spots located around them. Moreover, our system also helps tourists upload pictures to the online picture database.

We plan to improve the algorithm for extracting picture spots in consideration of other parameters (e.g., time, date and season). For example, our system may help people take pictures of flowers in bloom (e.g., cherry blossom) in spring and special scenes (e.g., sunsets) at nightfall.

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