Histogram: Spatiotemporal Photo-Displaying Interface

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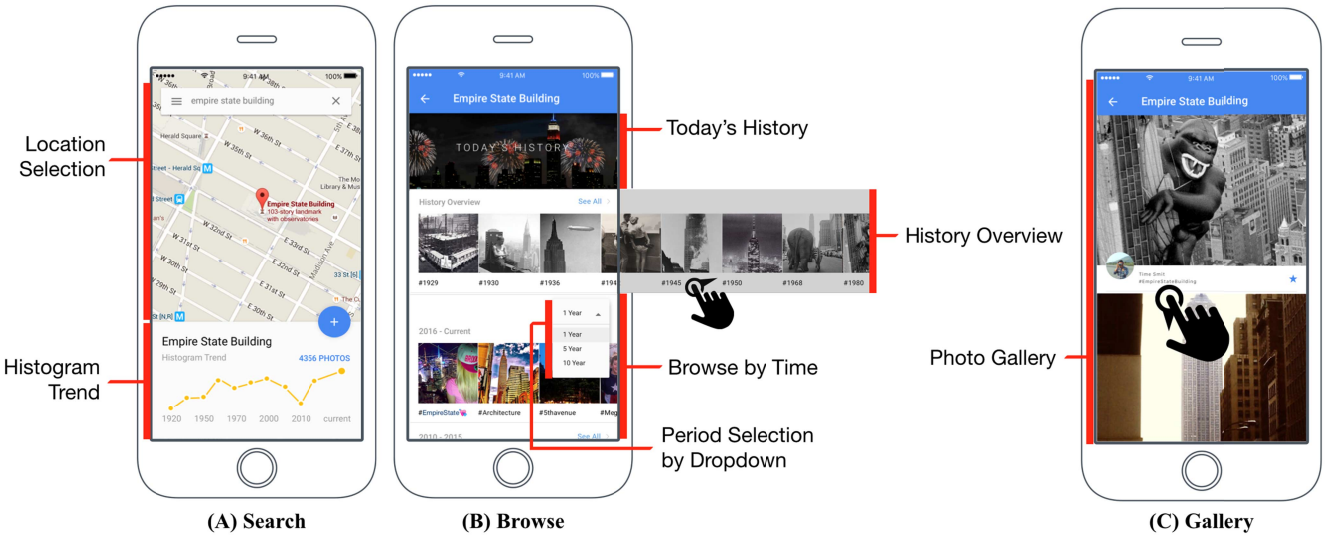

Figure 1. Interface of the Histogram.

ABSTRACT

As the smartphone has become more widely available, we easily take photos and upload them online to share with others. Photographs are abundant, but they are not used properly, even though they provide meaningful information about the social scenes of our daily lives. To address this issue, Histogram was created as a new interface for displaying and sharing location-related photographs chronologically to trace the changes in a location. The prototype of this system is mobile-optimized to encourage users to easily upload photos with their smartphones, so that the system can be run through social cooperative work.

Author Keywords

Digital photography; photograph interface; geo-tagged photography; history tracking; timeline; historical geographic information.

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INTRODUCTION

Through the widespread usage of smartphones, we use social networking services in our daily lives. Instagram exceeded 500 million monthly active users in June 2015, exceeding Twitter[1]. Also according to the Pew Research Center, 55% of online adults ages 18 to 29 use Instagram[2]. Those phenomena imply that image-based communication is emerging as a new social media usage pattern. Users share their experiences with others by uploading photos tagged with the location or with hashtags. As recording locations with photos becomes routinized behavior, professional genres of photography such as street photography, landscape photography, etc., have been extended to amateurs.

With the development and widespread use of technology and with the evolution media usage patterns, photos and the

[1] http://www.cnbc.com/2016/06/21/instagram-now-has-500-million-users.html

[2] http://www.pewinternet.org/2015/08/19/the-demographics-of-social-media-users/

embedded metadata of time and place included therein are providing meaningful information about each location. However, the current systems and services do not support tracking the transition of the location over time. This research presents a new interface for arranging location pictures chronologically to make socially created photos to function as the historic documents that provide meaningful information about the location.

RELATED WORK

Research studies about image displaying system present interfaces that arrange photos using either temporal criteria [1, 2] or spatial criteria [3, 5]. Each of these works separate time and space. Although research applying both temporal and spatial information has been performed [4], it focuses on the technological aspect of dynamic scene analysis and temporal reasoning. This method could be applied in our works to extract photos from the Internet.

Compared with the above systems, Histogram contains both temporal and spatial information simultaneously to trace the transition of the space. By providing a mobile-optimized interface for easily uploading photos from the users' smartphones, we aim to accelerate the voluntary uploading of photos by people so that the system is run through social cooperative works.

INTERFACE DESCRIPTION

The interface of Histogram has been subdivided into three stages: 1) Search; 2) Browse; and 3) the Gallery (Figure 1).

Search

The search page features an adapted map-based interface, and it also provides general information about the location (Figure 1A).

Location selection

Selecting the venue allows the user to search or upload photographs by GPS. The user can select the venue directly on the map or with a keyword search.

Histogram trend

After selecting the venue, at the bottom of the screen, the 'Histogram Trend' is presented and contains information about the number of photos uploaded by year with a line graph to track changes directly. This helps to discern the popularity of the spot by the time.

Browse

Once the target spot is selected, users can browse the photos in the browsing screen, which contains three menus: today's history, history overview and browse by time (Figure 1B).

Today's history

The section for today's history displays the uploaded photo of the day selected by users. By exposing users' photos on the main screen, the system encourages users' participation.

History overview

The history overview is what differentiates the system. By swiping the photos in this section, users can browse all of the representative photos of the year at once. Users can trace the transition of the location, which is the history of the venue.

Browse by time

This section contains photos clustered by a specific period. This helps users to easily find the specific time of the photos they're looking for. Also, users can select the criteria for the period from the screen's dropdown menu. Existing services like Instagram display photographs in descending chronological order, so it is hard to find the photos of the past. However, by clustering pictures by period, this interface allows users to simply browse the photos of the past.

Gallery

If users click the "see more" menu on the browsing screen, the screen moves to the Gallery screen, which displays all the photos of the selected area. By scrolling down, users can skim through the photos (Figure 1C).

CONCLUSION

Reflecting time series and space data simultaneously, Histogram provides a different view of utilizing user-generated digital photos as historical records. Based on the current prototype, we need to collect further image data from online and develop the system. Also, further studies about how to select the representative photos and about the visual display methods, like scrolling down or swiping to browse the pictures, should be conducted to develop the system.

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