GEOTAGGED PHOTO RETRIEVAL
FOR GROUND-BASED DISASTER MONITORING

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Abstract: Recently, a cloud-storage service provides easy preparation of geotagged photo datasets. However, though a large amount of photos are stored on internet, conventional point-based photo retrieval is inefficient to find significant photos in some operations, such as a disaster monitoring. Therefore, an additional assistance of photo retrieval is required to improve the efficiency in the disaster monitoring.

We focus on azimuth data taken from digital compasses to improve a geotagged photo browsing in the disaster monitoring. Moreover, we have proposed a context-based photo browsing. Additionally, we have focused on a clustering of filtered geotagged photos based on reverse-geocoding. Then, we have focused on a change extraction after a clean-up effort and urban reconstruction after Tsunami.

Our procedure consists of the following steps. Firstly, metadata, such as a date, latitude, longitude, and azimuth, are extracted from goetagged photos. Next, a path is input on a basemap, such as a road map and satellite images, to extract photos as approximate candidates using the latitude and longitude values. Then, extracted photos are filtered using azimuth data. After that, the filtered photos are sorted with a topology along the input path. Finally, sorted photos are browsed as a sequent slideshow along the input path, such as a street-view.

We conducted an experiment in the East coast of Japan. We prepared 6299 geotagged panoramic images using land-based mobile mapping system after the Great East Japan Earthquake in 2011. We also prepared 2781 geotagged photos using GPS cameras in 2012. Then, we have confirmed that our algorithm can perform geospatial retrieval for a street-view photo browsing. Moreover, we have confirmed that our algorithm support to detect changed objects in a clean-up effort and urban reconstruction after Tsunami.

We have clarified that a large amount of photos were useful for the ground-based disaster monitoring. We have also clarified that our algorithm can detect changed objects in disaster area.

KEY WORDS: Geotagged photos, Panoramic images, Photo retrieval, Reverse-geocording, Disaster monitoring