EventEnricher: A Novel Way to Collect Media Illustrating Events

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ABSTRACT

Exploiting event context to organize social media draws lots of interest from the multimedia community. In this paper, we present our system, called EventEnricher, to infer the semantics behind events and explore social media to illustrate events. We extend the set of illustrating images for a particular event by querying social media with diverse multimodal features and subsequently pruning the results using content based visual analysis. We integrate the solution into an intelligent interface that enables the user to browse the media collection illustrating events in an easy, effective and informative way.

Categories and Subject Descriptors

H.3.3 [**Information Storage and Retrieval**]: Information Search and Retrieval

Keywords

Events, Illustrating, Enricher, Social media

1. INTRODUCTION

The ever increasing amount of media available online, demands for intelligent ways to visualize and browse media collections. An event is the most natural way for humans to store and recall their memories. It can serve as a powerful instrument to organize media, thanks to its intrinsically multi-faceted nature. Hence, associating media to events has started to receive considerable attention [5, 1, 4, 3].

We propose a web service and interface called EventEnricher to help users infer the semantics behind the events and explore social media depicting events. There exist a special tag on the internet, called event machine tag to identify event in social media data. The machine tag is an additional metadata that is available from some events repositories (such as LastFM, Upcoming or Facebook) and media shared platform (such as Flickr and YouTube). When users take photos during the event, they are advised to upload them to media sharing websites with such a tag in order to explicitly associate the photos with the event. Hence, the machine tags provides explicit and accurate links between events and multimedia documents. However, the set of online media labeled with such a machine tag is generally a tiny subset of all media that are actually relevant for this event. Our goal is to find as much as possible media resources that originate from events but have not been tagged with an event machine tag. We extend the set of illustrating images for a particular event by querying social media with diverse multi-modal features, and exploit content and context based analysis techniques to discard irrelevant media.

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2. OUR PROPOSAL

We address this issue by analyzing the event multi-facets. Starting from an event description, three attributes can easily be mapped to metadata available in media shared platforms: the *what* dimension that represents the title, the *where* dimension which corresponds to the geo-coordinates attached to a media, and the *when* dimension that is matched with either the taken date or the upload date of a media. Querying Flickr or YouTube with just one of these dimensions returns far too many results: many events took place on the same date or at nearby locations and the title is often ambiguous. We also find that there are recurrent annual events with the same title and held in the same location, which makes the combination of "title" and "geo tag" inaccurate. In the following, we consider the two combinations "title" + "time" and "geotag" + "time" for performing search query and finding media that could be relevant for a given event. Thanks to the public REST API in most media sharing web sites, the query is easily performed.

However, it is well known that querying with metadata parameters does not achieve considerable accuracy. Therefore, a content based approach is employed to remove the irrelevant data. In details, we build a training dataset composed of the media labeled with the event machine tag. The photos resulting from query by title or location compose the testing dataset. The visual features used in our approach are 225D color moments in Lab space, 64D Gabor texture, and 73D Edge histogram. For each image pairs in the training data, the nearest neighbors algorithm using the ***L1*** distance measure in the training set is performed and the smallest distance is taken as threshold. The visual similarity between two images is computed as follows:

$$L_1(F_j, E_i) = \sum_k |F_j(k) - E_i(k)| \quad (1)$$

where $F_j(k)$ and $E_i(k)$ are normalized concatenated low level feature vector of the images in the Testing and Training dataset respectively. F_j is added to the set of media illustrating the event when

$$\exists E_i \in E : L_1(F_j, E_i) < THD_i$$

where THD_i is the threshold which is also learned from the E data. As shown in Equation 2, we use a strict strategy to finalize the threshold, which is chosen as the minimal value of similarity of images pairs in training set. The threshold is also adaptive to different events due to the visual diversity within the training dataset.

$$THD_i = \min_{\{j\}\setminus i} \sum_k |E_j(k) - E_i(k)| \quad (2)$$

It is clear that the strategy of deciding the threshold is rather conservative, many relevant media will also be pruned by our system. In order to bring visual diversity within the event illustration, the "owner" metadata is exploited. It is reasonable to assume that a person cannot attend more than one event at a time. Therefore, all the photos that have been taken by the same owner during the event duration should be assigned to the event. In effect, if the owner has shared additional photos during this period, they are automatically added as illustrative media for the event. For more details of our media collection approach please refer to [2].

3. BROWSING MEDIA WITH EVENTENRICHER

Based on our proposal, a web service is built to help user browse media data from events. Flickr is used as the basic media sharing platform, although EventEnricher can easily be extended to cater for other source such as YouTube, Google Picasa, etc... The users can interact with the system through 4 parts, as shown in Figure 1. Part (A) is the input parameter, while an event URL in last.fm, DailyMotion, Upcoming, or URI in EventMedia dataset [6] could be the input to query the event. When event information is retrieved, the abstract is presented in part (B), and the home page of the event is depicted in part (D). Then, the event's machine tag, title, geo location, time metadata are extracted and used to query the photos in Flickr, as described in [2]. The results from the query, as well as from the visual pruning and owner refinement process, can be accessed by the list in part (C). With a mouse click, the photos are presented in part (D), as shown in Figure 2.

Figure 2 also shows the effectiveness of our system on collecting event relevant photos. For last.fm event (id=1369317), only 10 photos are labeled with machine tag, and 285 and 48 photos are retrieved by the location and title based query. After the visual pruning and owner refinement process, a set of 262 photos illustrates the event.

4. CONCLUSION

In this paper, we present EventEnricher, a web interface to help users explore media collections taken during events. Thanks to the retrieval of many relevant media originating from events, we enrich the media from the query with time, location and title facets, and exploit the visual content and owner metadata to remove the noise data. Ultimately, we provide an environment for users to explore shared media taken during social events.

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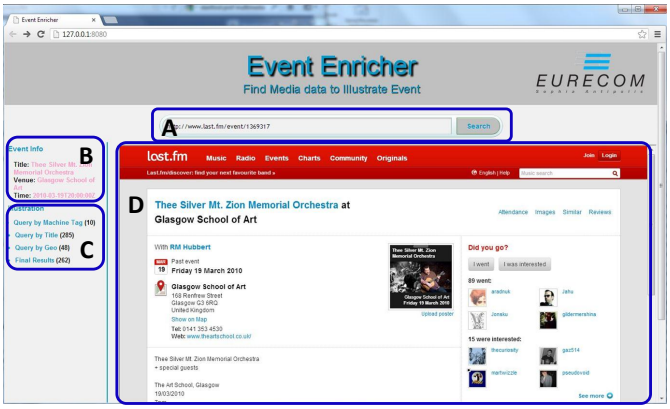

Figure 1: EventEnricher Interface, (A) Input URL; (B) Event Abstract; (C) Navigation of the Results; (D) MainView: to show the event homepage and photos in the results

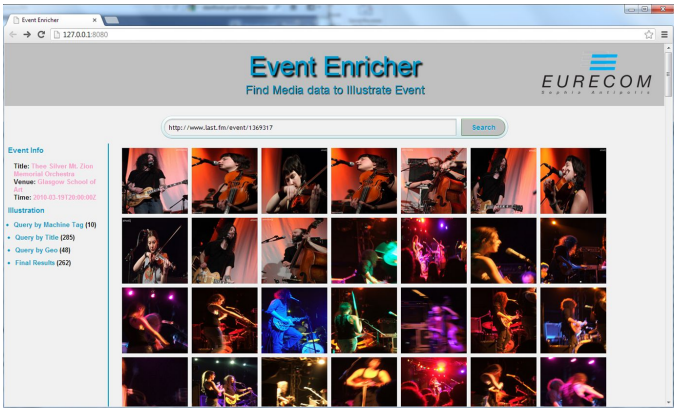

Figure 2: Results on Lastfm event:1369317

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