MediaFinder: Collect, Enrich and Visualize Media Memes Shared by the Crowd

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ABSTRACT

Social networks play an increasingly important role for sharing media items related to human's activities, feelings, emotions and conversations opening a window to the world in real-time. However, these images and videos are spread over multiple social networks. In this paper, we first describe a so-called media server that collect recent images and videos which can be potentially attached to an event. These media items can then be used for the automatic generation of visual summaries. However, making sense out of the resulting media galleries is an extremely challenging task. We present a framework that leverages on: *(i)* visual features from media items for near-deduplication and *(ii)* textual features from status updates to enrich, cluster and generate storyboards. A prototype is publicly available at `http://mediafinder.eurecom.fr`.

Categories and Subject Descriptors

H.3.4 [**Information Systems**]: Information Storage and Retrieval—*World Wide Web*

Keywords

Topic Generation, Storyboard Identification, Visual Summarization, Storytelling, Social Media

1. INTRODUCTION

Capturing social media memes and building narratives is the objectives of several research projects and commercial products. For example, the TransMedia Observatory[1] has developed a system that collects and analyzes the most circulated images across the main news media (news web sites, press agencies, radio and TV news and newspapers) in order to detect events [1]. Storify[2] aims to support the creation of stories about events using social networks by sorting and organizing the elements of a story and by guiding the user towards an intended experience. Generating stories from social media streams is also the objective of Storyful[3]. While these two approaches position the role of a social platform as a container of fresh and breaking news items, they are leveraging on user interactions for creating stories as a supervised task. Mahaya[4] has recently showcase a story about the 12/12/12 concert[5]: the different spikes of the concert correspond to the artists performance and are guiding the narrative, while images shared on Instagram and microposts collected on Twitter are used to illustrate the story. In this paper, we tackle the challenge of reconciling social media items that could illustrate not only events but anything trending within a social network. We then propose visual summaries of these events, applying post-processing techniques such as image deduplication in media galleries and named-entity recognition techniques for organizing the processed media items.

2. MEDIA SERVER

Twitter and its ecosystem (TwitPic, TwitterNative, MobyPicture, Lockerz or yfrog), GooglePlus and YouTube, Facebook and Instagram, Flickr and FlickrVideos, MySpace have all in common to offer search APIs over the content they host. Those search functions, however, provide results that vary according to the time the query has been triggered, covering a window of time that ranges from only the recent past to many years ago. In addition, they offer different parameters that enable to customize search queries (e.g. filtering by location). MediaServer is composed of media item extractors for these 12 media sharing platforms. It takes as input a search term and a parallel key-search is then performed to these social networks. Each platform has a 30 second timeout window to deliver its results. When the timeout has expired, or when all social networks have responded, a unified output is delivered [3, 5].

The metadata attached to the microposts retrieved vary in terms of schemas, data types and serialization formats. We harmonize these results and project them to a common schema. This component performs also a cleansing process, discarding items which are older than seven days ago, in order to keep only fresh media items. MediaServer provides not only a way to capture a snapshot at a particular instant of what has been shared in social media platforms, but enables also to monitor the results of a search query over a longer period of time, by automatically re-issuing the same query at a regular frequency and by cumulating the results [2].

[1] `http://www.otmedia.fr/`
[2] `http://storify.com`
[3] `http://storyful.com`
[4] `http://mahaya.co`
[5] `http://121212.mahaya.co`

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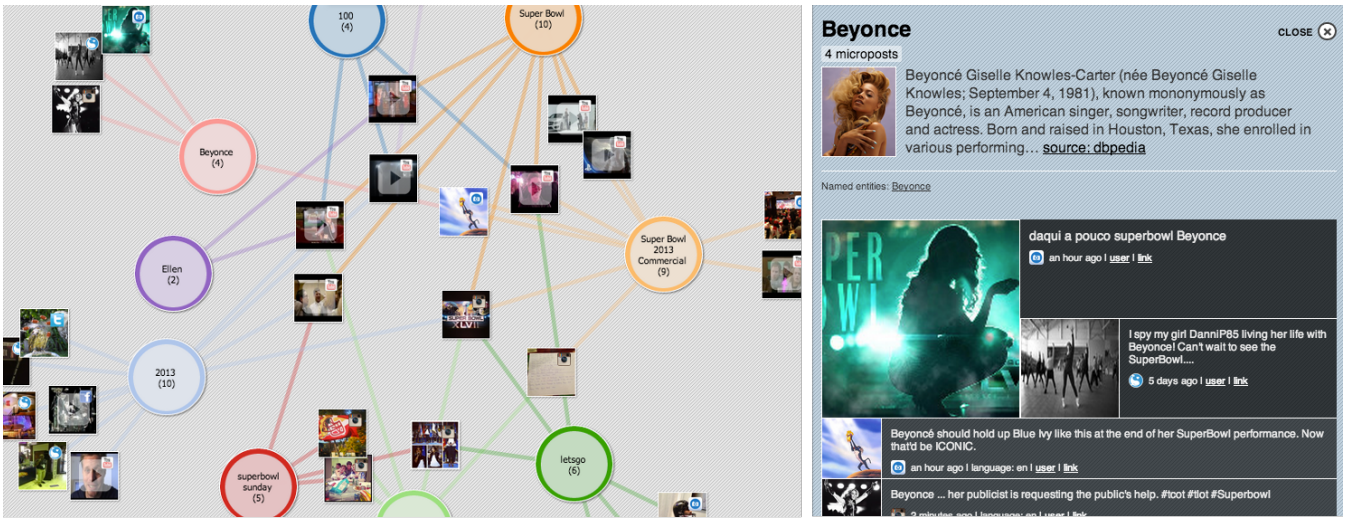

Figure 1: *a)* Graph View of the *named entity* based clustering operation on the collected items. *b)* Visual summary of the cluster "Beyonce": the introduction is fetched through disambiguating the selected topic on DBpedia and it is followed by the storyfication of microposts and media items.

3. MEDIA FINDER

MediaFinder aims to automatically generate visual summaries using the results of MediaServer. This framework is composed of the following components:

- Near de-duplication detection: The same media item can occur in multiple microposts, typically when a re-tweet or re-share operations is performed. State of the art techniques in content-based image retrieval are used to detect near-duplicate images.
- Named Entity Extraction: For each micropost, we extract named entities using the NERD framework [4]. A multi-lingual entity extraction is performed and the entities extracted are typed using the NERD Ontology[6].
- Topic Generation: We identify topics using four clustering operations using the textual features of the microposts (LDA, named entities, etc.).

Once the clustering operations are completed, the entity which best represents a set is selected. We call this process *topic generation*. For each cluster, a Bag of Entities (BOE) is computed and the most representative entity is selected to be the cluster topic. We disambiguate this topic using a DBpedia URI[7]. Consequently, the output of this component is a set of clusters (limited to ten for visualization optimization) that corresponds to topics extracted from the data collected.

The visualization emphasizes the different aspects of storyboards. The graph view shows the relationships between microposts and topics, while the timeline view emphasizes the time dimension. The user can watch and interact with the summarized view of all the topics or select a particular one with the additional details. In addition, the states of different views are persistent through the URLs which makes easy sharing possible. Figure 1 illustrates MediaFinder with the `2013 Superbowl event`. One of the cluster (labeled as "Beyoncé") brings the attention of the user. By simply clicking on the cluster, an illustrative storyboard is depicted mixing microposts and social media shared by the crowd.

[6] `http://nerd.eurecom.fr/ontology/nerd-v0.5.n3`
[7] `http://dbpedia.org`

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