

## Accepted Manuscript

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PII: S0262-8856(15)00142-0  
DOI: doi: [10.1016/j.imavis.2015.12.004](https://doi.org/10.1016/j.imavis.2015.12.004)  
Reference: IMAVIS 3451

To appear in: *Image and Vision Computing*

Received date: 13 January 2015  
Revised date: 20 November 2015  
Accepted date: 22 December 2015



Please cite this article as: Matthias Zeppelzauer, Daniel Schopfhauser, Multimodal classification of events in social media, *Image and Vision Computing* (2016), doi: [10.1016/j.imavis.2015.12.004](https://doi.org/10.1016/j.imavis.2015.12.004)

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## Multimodal Classification of Events in Social Media

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### Abstract

A large amount of social media hosted on platforms like Flickr and Instagram is related to social events. The task of social event classification refers to the distinction of event and non-event-related content as well as the classification of event types (e.g. sports events, concerts, etc.). In this paper, we provide an extensive study of textual, visual, as well as multimodal representations for social event classification. We investigate strengths and weaknesses of the modalities and study synergy effects between the modalities. Experimental results obtained with our multimodal representation outperform state-of-the-art methods and provide a new baseline for future research.

Keywords: Social Events; Social Media Retrieval; Event Classification; Multimodal Retrieval

## 1 Introduction

Social media platforms host billions of images and videos uploaded by users and provide rich contextual data, such as tags, descriptions, locations, and ratings. This large amount of available data raises the demand for efficient indexing and retrieval methods. A tremendous amount of social media content is related to social events. A social event can be defined as being planned by people, attended by people and the event-related multimedia content is captured by people [1]. The classification of social events is challenging because the event-related media exhibit heterogeneous content and metadata are often ambiguous or incomplete.

Indexing of social events comprises different tasks, such as linking media content belonging to a particular event (social event clustering or social event detection) [2] and summarizing the content of an event (event summarization) [3]. An important prerequisite for social event analysis is the distinction between event-related content and content that is not related to an event from a given stream of media. We refer to this task as social event relevance detection or just event relevance detection. After the selection of event-relevant content, a next task is the prediction of the event type. This task is referred to as social event type classification or event type classification.

The major challenges in the context of social event classification are (i) the high degree of heterogeneity of the visual media content showing social events, and (ii) the incompleteness and ambiguity of metadata generated by users. Figure 1 shows examples of event-related images as well as images without association to an event type (non-event images). We observe a strong visual heterogeneity inside the event classes. The non-event related images, however, are diverse and thus to find rules that separate them from event-related images is difficult. Figure 2 illustrates an image with ambiguous metadata. The tag “#vogue” indicates a fashion-related event while “#festival” may also refer to a concert or musical event. The visual appearance of the related image resembles the appearance of the non-event images from Figure 0 rather than that of images from the “fashion” class.

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