

Chapter 14

Extraction and Annotation of News Topics From TV Streams for Web Video Sharing: A Contribution to Produce Reliable Online Video News Content

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ABSTRACT

Today, with increased internet access, users are often interested in new content-based multimedia applications of high added value such as interactive TV, video on demand (VoD), and catch-up TV services such as YouTube or Dailymotion frameworks. Despite the easy and rapid access to media information of these services, they present the risk of the wide propagation of fake news. As a solution, the authors propose that the input for these services must be from a trustworthy traditional media, precisely TV program content. So, the automatic process of TV program identification and their internal segmentation facilitate the availability of these programs. In this chapter, the major originality of the authors' approach is the use of contextual and operational characteristics of TV production rules as prior knowledge that captures the structure for recurrent TV news program content. The authors validate their approach by experiments conducted using the TRECVID dataset that demonstrate its robustness.

INTRODUCTION

Today, the continually increasing volumes of digital video have contributed to conceive new high added value services around television and video platforms, such as Interactive TV and VoD (Video on demand). For example, we notice a rise of Internet Protocol Television (IPTV) and the distribution of multimedia content via the Internet, and especially, a wide availability of services like VoD and catch-up TV. However, in order to increase its audience traditional media benefit from the wide spread of Internet to the characterized by the low cost and the easy access. For these reasons, the majority of TV channels tends to rebroadcast their productions in alternative media by uploading it on VoD and catch-up TV services. In fact, if the input data for these service it is generated from TV streams content approach can help minimize “fake news” on alternative media (Kai et al., 2017), since this traditional content is considered as a truthful media source.

So that, we assume that one of the best ways to get a reliable video Web content on VoD and catch-up TV services is to get it from traditional Media, essentially TV streams. This challenge needs several content-based video operations (Le et al, 2017) such as representation, segmentation, structuring, indexing and retrieval. A typical scenario consists in identifying particular TV programs from large TV streams and then the segmentation of identified program into consistent and semantic units to be available in a short period after the satellite broadcasting. Thereafter, these units were be annotated for a better use by VoD or catch-up TV services. The program identification and their semantic and temporal internal segmentation needed by VoD or catch-up TV services that must usually be done in very short period of time.

Video segmentation, indexing and retrieval are based on techniques that extract relevant features to structure TV streams into distinct programs. The research on this topic covers several complementary areas: video analysis, video abstraction, and video retrieval (Souza et al., 2014). Video analysis addresses the extraction of low-level visual features, such as color, texture, shape and salient points. Finally, video retrieval is based on the extracted features and allows users to query and search the video database (Rossetto et al., 2017). Although many efforts have been devoted into these three areas, the accuracy of the existing systems is still far from satisfactory. Indeed, a thorough study of the state of the art shows that the proposed works are divided into two classes. The works of the first class are interested in locating programs in TV stream (Hu et al., 2011; Manson et al., 2009; Choroś, 2015b). While the works of Abduraman et al. (2011), Goyal et al. (2009), Misra et al. (2010), Liang et al. (2018), Younessian and Rajan (2015) of the second one carry out the internal structuring of TV programs. These works are suitable only for media types known in advance. However, few works offer a whole approach starting from the inter-segmentation step of programs in long TV streams to the intra-segmentation level and finally the annotation step. The last step dedicated essentially to prepare a reliable processed content ready to be exploited by online video sharing platforms.

Based on this observation, the goal of our contribution is present a whole approach. The proposed approach aims to cover all the required steps to obtain a structured and reliable TV content well annotated for exporting to VoD and catch-up TV services (Figure 1)

The rest of the paper is structured as follows. In section 2, we present the related works and the motivation and context. Section 3 introduces the prior knowledge of media production and grammar video concept. In Section 4, we introduce the TV program identification in TV streams. Section 5 presents the topic detection of identified news programs. Section 6 introduces the segmented video annotation and preparing for Web exporting. Experiments and evaluation results are presented in Section 7. We conclude with discussions of the proposed solution and an outline of future work.

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