Chapter XXII
Context-Aware Capture and Sharing of Mobile Videos

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ABSTRACT

Video management research has been neglecting the increased attractiveness of using camera-equipped mobile phones for the production of short personal video clips. But specific capabilities of modern phones—especially the availability of rich context data—open up new approaches to traditional video management problems, such as the notorious lack of annotated metadata for personal video content. In this chapter, we present MobiCon, a mobile, context-aware personal video production and sharing tool. MobiCon allows users to capture video clips with their camera phones, to semi-automatically create MPEG-7-conformant annotations by exploiting available context data at capture time, to upload both clips and annotations to the users' video collections, and to share these clips with friends. Thereby, MobiCon enables mobile users to effortlessly create richly annotated home video clips with their camera phones, paving the way to a more effective organization of their personal video collections.

INTRODUCTION

With recent advances in integrated camera quality, display quality, memory capacity, and video compression techniques, people are increasingly becoming aware of their mobile phones as handy tools for the spontaneous capture of interesting events in the form of small video clips. The characteristics of mobile phones open up new ways of combining traditionally separated personal video production and management tasks at the point of video capture. The ability of mobile phones to run applications allows video production tools that combine video capture and video annotation. The classic approach of using video annotation tools to provide metadata for the organization and retrieval of video long after capture, lacks user acceptance leading to the characteristic lack of metadata in the home video domain (Kender & Yeo, 2000). Context data about video capture available on mobile phones can be exploited to ease annotation efforts, which users try to avoid even at the point of capture (Wilhelm, Takhteyev, Sarvas, van House & Davis, 2004). Time, network cell, Global Positioning System (GPS) position, address book, and calendar can all be used to infer events, locations, and persons possibly recorded.

Furthermore, mobile phone-based video production tools can combine video capture with video sharing. With the ability to access the Internet via 2G, 3G and often also WiFi networks from almost anywhere, phone users can directly load their clips to their personal video collections stored on their PCs or by service providers disencumbering the limited memory resources of their phones. They also can share clips instantly with their friends. Digital rights management platforms like Open Mobile Alliance's Digital Rights Management (OMA DRM) give users rigid control over the content they share preventing unwanted viewing or copying of shared clips.

However, video management research so far has mainly regarded mobile devices as additional video consumption channels. There has been considerable work concerning mobile retrieval interfaces (e.g., Kamvar, Chiu, Wilcox, Casi & Lertsithichai, 2004), the generation of video digests for mobile users (e.g., Tseng, Lin & Smith, 2004), and adaptive video delivery over mobile networks (e.g., Böszörményi, Döller, Hellwanger, Kosch, Libsie & Schojer, 2002), but a comprehensive view that considers the use of mobile phones as video production tools is still missing.

In this chapter, we present MobiCon: a context-aware mobile video production and sharing tool. Forming a cornerstone of the Candela platform, which addresses mobile personal video management from production to delivery (Pietarila, Westermann, Järvinen, Korva, Lahti & Löthman, 2005; Sachinopoulou, Mäkelä, Järvinen, Westermann, Peltola & Pietarila, 2005), MobiCon allows Candela users to record video clips with their camera phones and to semi-automatically annotate them at the point of capture in a personalized fashion. After recording, MobiCon extracts context data from the phone and passes it to an annotation Web service that derives reasonable annotation suggestions. These do not only include time- or position-based suggestions such as the season, city, or nearby points of interest possibly documented by the video; they also include personal calendar- and address book-based suggestions such as likely documented events and known locations like a friend's house. Besides these suggestions, the user can select concepts from a personal ontology with little manual effort or enter keywords for additional annotation.

MobiCon is further capable of uploading clips and their annotations to the users' private video collections in Candela's video database directly after capture and permits users to immediately share these clips with friends.

Thus, MobiCon enables mobile phone users to create and share richly annotated personal video clips with little effort, paving the way towards the more effective organization of their personal video collections. The extensible architecture of the annotation Web service allows us to embrace