

Chapter 22

Mobile Video Streaming

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ABSTRACT

Mobile video streaming is a natural augmentation to today's thriving Internet video streaming service. With the rapid growth of the capability of mobile handheld devices and abundant bandwidth from high-speed wireless networks, it is expected that mobile video streaming service will soon become a lucrative business section and a thrust for technological advancement on computer and telecommunication industries. In this chapter, essential technical components for constructing mobile video streaming systems are introduced. They include the latest development on broadband wireless technology and video-capable mobile handheld devices. As many modern technologies are often driven by consumer demand, user experience and expectation are discussed from the perspective of mobile video streaming. At the end, several cutting-edge research and development breakthroughs are presented as they may change the future of mobile video streaming systems.

INTRODUCTION

Mobile video streaming not only is a rising mobile commerce model but also facilitates other mobile commerce businesses. Within the past several years, digital video streaming has become one of the key Internet applications that have profound impact on our daily life. This success changes our everyday entertainment activities as well as

many business operations around the world. As "YouTube" (YouTube, 2009) grows to be one of the most popular online video streaming websites, the demand for mobile video streaming service has gained tremendous momentum to becoming the next big wave in the next-generation wireless Internet. The main driving forces behind this trend are the popularity of modern mobile handheld devices which are capable of processing digital video, and the fast development and deployment of broadband wireless networks.

DOI: 10.4018/978-1-61520-761-9.ch022

In the early age of Internet there was no video streaming because of the insufficient bandwidth on computer networks. Compared with typical Internet data services such as emails and file transfers, digital video streaming requires much more stringent requirements on the end-to-end packet delivery latency and considerable amount of network bandwidth consumption. Only after broadband Internet access became commonly available to general public through massive deployment of DSL (digital subscriber line) and high-speed cable modem, online video streaming service began to blossom.

A typical network-based digital video system involves the following three processes: video content creation, video storage, and video distribution. Apparently the first step is to create video contents. While it was once a costly process requiring expensive professional camera equipments, today almost everybody can shoot video with inexpensive digital cameras/camcorders. This wide availability of video content production makes everyone a show producer, and therefore furnishes the enormous video collection in social networking websites such as YouTube. Since recorded videos require significant memory space for storage (and further distribution), it is almost necessary to apply state-of-the-art video compression algorithms/standards before they are ready for streaming over the network. Currently the most popular digital video standards include MPEG-2, H.263, and H.264/MPEG-4 AVC. The last, but definitely not the least, step is to distribute the video contents from one place to the other(s) through wired or wireless networks. This process is also known as “streaming” because video content is delivered packet by packet (like continuous water flow) from the source to the destination. The source and destination of video stream can be powerful computer servers (such as YouTube web server), desktop computers, or even small handheld computing devices.

The focus in this chapter is to provide readers with various technical perspectives surrounding

the mobile video streaming technologies. First, different types and configurations of mobile video streaming systems are classified into three general categories. Then, the key components in such systems will be introduced and compared (when applicable). This includes wireless networks and video-capable mobile handheld devices. Also, in this consumer-centered commerce, user experience and expectation are discussed. Finally, some thoughts on future research directions and conclusions are presented.

MOBILE VIDEO STREAMING SYSTEM CLASSIFICATION

When it comes to the business life today everyone is always on the move and rarely able to take the time to watch their favorite shows or sports games. Because of the lack of time and the demand for entertainment the market for video streaming handheld devices is one of the only markets in America that is constantly rising. Mobile video streaming systems can be categorized into three different types. There is broadcasting, which is mobile streaming television directly from the source as it appears, such as regular television. There is also the client-server approach for mobile video which is often referred to as mobile video on demand. This is when the user pulls a specific video from a host at any given time, such as YouTube. Lastly there is peer to peer sharing which is when every mobile device acts as a server and a client both hosting and receiving information. Regardless of the type of mobile video streaming system the demand for such service is at an all time high and experts are saying that the demand for such systems will only grow in the future.

Broadcasting

Broadcasting in the paradigm of mobile video streaming means that television program videos are directly sent to mobile handheld devices from

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