摘　要

随着移动视频服务的兴起，移动终端如手机，PDA（个人数字助理）等的广泛应用，人们对移动网络提供的服务也提出了越来越高的要求，移动视频服务正是现阶段的一个热点。正如我们所知，移动终端设备都具有一些共性特点如：显示分辨率低，芯片处理能力弱等。同时移动网络还受限于带宽，所以通常在移动网络中传输的视频流的特点就是低码率低分辨率的视频流。MPEG-2 为数字视频广播应用、高清晰度数字电视（HDTV）和 DVD 等场合而制定，目前已经广泛应用于我们的日常生活以及各种产业中，所以大部分的视频资料都是以 MPEG-2 视频标准压缩存放。但是 MPEG-2 的视频数据码率比较高，并不适合无线网络下的应用。随着新一代视频压缩标准（AVS-M，H.264/AVC）的出现，为了更好的提供多媒体资源的访问存取，而又不过分扩张存储资源，视频转码技术正是解决这样问题的一个关键技术。

本论文首先简要介绍了视频压缩标准的发展状况，以及视频转码技术的研究背景和研究现状，并提出了我们的主要研究内容及主要工作。

其次，本文专注于降分辨率转码中的快速模式选择问题的研究。针对移动视频服务的典型应用中所存在的问题，提出了一种新的、降分辨率视频转码中的快速模式选择算法，用以解决在新的视频压缩标准中采用的多模式选择带来的计算复杂度增大的问题。在降分辨率视频转码中，根据解码得出的信息，通过适当的合并和分割操作，快速的找到当前宏块的编码模式，进而显著加快转码速度。

接着，提出了一种可以应用于移动视频转码中的动态跳帧算法。在低码率下，为了提高转码后的视频主观质量，提出了帧间相似度的概念以应用在视频跳帧算法中，并设计了该动态跳帧算法。本文充分分析了跳帧算法的研究中所提出的和需要解决的问题，比较了各种跳帧策略的判断准则在我们的系统框架中的预期效用。最后选定了该算法的跳帧判断标准，并结合一些原有的解码信息改善了动态跳帧算法的效用。

本文最后列举了一个模拟的流媒体传输系统，并把我们研究的算法的一部分合理的应用于实际应用中。证明了我们的算法极大的加快了转码的速度，同时兼顾了转码后的视频质量。

关键词：视频转码；快速模式选择；动态跳帧；流媒体系统；MPEG-2；AVS-M；H.264/AVC

Abstract

With the development of mobile video services, the mobile terminal devices are widely used, such as mobile telephone, PDA etc. So high performance video services are deeply needed and are becoming a new focus. As we know, the terminal devices have some common characteristic, such as small display screen, low computational ability etc. And limited by the channel bandwidth, the transmitted video stream is usually in low bitrate and low spatial resolution. MPEG-2 video compression standard is designed for digital video broadcast, HDTV and DVD. Now, it is widely used in our daily life and various industries, so most of the video data is compressed and kept in MPEG-2 format. But the video data bitrate in MPEG-2 is a little high and it is not suitable for wireless lan application. To meet such a demond, the new generation video compression standard (e.g. AVS-M, H.264/AVC) is invented which can be well used in accessing multimedia resource. Video transcoding is such a key technique to realize such a conversion.

In this thesis we first review the development of video compression standard and video transcoding techniques. Then point out the new problems with the new compression standard in transcoding and show what we will focus on.

Second, we mainly focus on fast mode decision in reducing spatial resolution transcoding from MPEG-2 to AVS-M or H.264/AVC. As the video standards adopt more modes for motion estimation, the computation complexity increases more. Our resolvent considers such new characteristic abundantly. In reducing spatial resolution transcoding, we analyse the decoded information and do some merge or split operations to directly find the best motion estimation mode. By reducing the complexity of motion estimation which consumes the most time of encoding, the transcoding speed is highly increased.

Third, we focus on the research of dynamic frame skip in transcoding. In low bitrate transmission, to increase the subjective video quality, we designed a new dynamic frame skip algorithm which is based our frame similarity concept. Comparing all the existing judge rules in frame skip, we select the most suitable one to implement in our scheme. Furthermore we consider the decoded motion information to improve the utility of our dynamic frme skip algorithm.

In the end, a simulative stream system is introduced. Our transcoding algorithm is applied in it which could prove the performance of our algorithm.

Keywords: video transcoding, fast mode decision, dynamic frame skip, streaming media system, MPEG-2, AVS-M, H.264/AVC