Real-time video streaming server, decoder/player for 3G cell phones

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With the recent advances in video compression technology (MPEG4 / H.263 / H.264 / AVS), broadband network, mobile network (GPRS/3G), and wireless (WI-FI/bluetooth) network, it is now possible to perform real-time video surveillance and conferencing anywhere and any time. While H.263 and MPEG4 are used in Multimedia Messaging Service (MMS), the state-of-the-art video compression standard is called H.264 which is 2 times better than MPEG4.

The aim of this final year project was to develop a real-time video streaming server and decoder/player for 3G phones. The H.264 video standard and Adaptive Multi-Rate (AMR) audio standard have been used in this system. Optimization on speeding up the system became the challenge of the project. Besides, the stability of the system, as well as the synchronization between video and audio are also our major concerns in this project.
COMPONENTS

Streaming Server

Network
- Single Server Multiple Client
- In-order delivery
- Video/Audio packets pairing

Video
- Quality control
- Real-time preview

Others
- Video/Audio source selection

Client Player
- Video/Audio synchronization
- Jittering removal

AMR Decoder
- 8000 samples per second
- 16 bits per sample
- 50 frames per second

H.264 Decoder
- Baseline Profile
- QCIF (176x144) Format
- 8 frames per second
RESULTS

Optimization Achievement
Without optimization, the client player cannot decode one frame in a second. Making the decoder fast became a big challenge.

(Result is obtained using Motorola A1000 with ARM9 166MHz processor at QP = 28, Intraperiod = 50 frames.)

Bandwidth Usage
GPRS promises data rates from 56 up to 114 Kbps. For 8 frames per second, our product supports both 2.5G and 3G cell phones.)