Porting of Audio Video coding Standard (AVS) Decoder on an ARM-based Embedded System-On-Chip

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**AVS** (Audio Video Coding Standard) is the state-of-the-art video compression technology developed in China. Its quality, compression ratio are close to current advanced technology but with lower complexity.

**ARM**, a common embedded processor applied in most mobile devices, such as NDS, cell phone and pocket PC.

**Current Video technology** in mobile devices demands more power and specified hardware. However, combining the above technologies can form an efficient and flexible solution against the above problem.

**Aims and Features**

This project is to port and speed up an AVS-M decoder to make it able to play the AVS-M video on ARM-based embedded system in real time.

**Features**

- Total software implementation
- Audio part – MP3
- Video part – AVS-M
- Playback in real-time
Optimization of AVS-M Decoder

- The decoder structure was simplified
- Each major functional block was optimized

Multiplexing of AVS-M video and MP3 audio in AVI

AVI is a common multimedia container format. Its interleaved structure in storing the video and audio data for each frame allows synchronization in playback by the player.

Testing Environment

- Embedded Linux
- ARM920T Processor (200MHz) w/o special hardware support
Optimization Gain

It shows the speed-up of the major optimized parts of the AVS-M decoder.

The speed-up is defined as
Original time taken
New time taken

Playback of Audio and Video

Before optimization,
The frame rate can only be 4fps in QCIF format even without audio

After optimization,
frame rate can reach much higher with MP3 audio playback
(results are shown in right pictures)

Conclusion

Performance
The optimized decoder is able to play AVS-M video with audio at 25 fps,
which is above 10 times faster than the original one. It gives a satisfactory performance in QCIF and QCIF+.

Feasibility
It is practical to port the AVS-M software decoder into most mobile devices without any special hardware support.