Background

- Diversification of digital video contents
  - Broadcasting (One-seg, MediaFLO)
  - Internet (Video sharing, On demand)

- Demand for ...
  - Multiple video displayed
  - Decoding of high resolution videos

However, these are difficult to realize due to constrained resources of mobile terminal
Objectives

Implement low computational cost video decoder by performance optimization and simplification of decoding process

Mobile phone, MID, Music player, Portable game console...

Decoding of high resolution video

Multiple videos displayed

Assist quick discovery of a desired video

Broadcasting

DVB-H

One-Seg

MediaFLO

DVB

ISDB

Video sharing

On demand

Internet
Targeted video coding

- Videos for mobile terminals
  - One-Seg, MediaFLO, Internet distribution
  - **H.264 is common**
    - Employs high complexity coding tools
    - Decoding cost is also high

- High resolution videos
  - HD broadcasting, Optical disk media
  - **MPEG-2 is common**
    - Complexity is lower than that of H.264
    - However, decoding cost is much higher than low resolution H.264 video

Performance optimization
Decoding process simplification
Optimization of H.264 decoder

- Utilizing SIMD extensions
  - Introduce optimized library of OpenMAX (API)
    - Entropy decoding, Inverse quantization, Inverse transform, Intra prediction, Motion compensation and Deblocking filter are replaced

- Simplifying decoding process
  1. Debloclking filter skip
    - Skip the most costly function of H.264 decoding
  2. Simplified motion compensation
    - High cost 6 tap filter is replaced low cost bilinear filter
Optimization of MPEG-2 decoder

- Utilizing SIMD extensions
  - Motion compensation, Inverse discrete cosine transform and Variable length decoding are optimized
  - OpenMAX does not support MPEG-2

- Simplifying decoding process
  - Simplified DCT
    - Discard high frequency coefficients
      - Normal: 8x8
      - Simplified: 4x4
  - VLD skip
    - Multi-symbol VLD of unnecessary coefficients
      - Using a special reference table

![4x4 IDCT matrix]