
EE 382C Embedded Software Systems
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Scalability of Streaming Media Over the Internet

- **Purpose**
  - provide quality of service through channels with various bandwidths
  - provide quality of service to receivers with different processing capabilities
  - provide quality of service over best-effort IP network

- **Scalable profiles in MPEG2 (base layer & enhancement layer)**
  - data partitioning
  - SNR Scalability
  - spatial Scalability
  - temporal Scalability

- **FGS framework in MPEG4**
  - FGS: fine granular scalability
  - Being able to enhance base layer using partial information from enhancement layer
  - Key issue: bit-plane encoding
**Bit-plane Encoding**

**Compare to run-level encoding**
- Coded content is scalable
  - Based on bit plane
- Coding is more efficient
  - Do not need to code the highest all zero bit planes
  - Bit plane is more suitable for VLC coding

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<tr>
<th>DCT coefficients</th>
<th>Bit Plane</th>
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MSB

LSB
Synchronous Data Flow (SDF) Model for MPEG4 with SNR Scalability Profile Using FGS Framework

Target: QCIF (176 X 144)
DCT: discrete cosine transform (8 x 8); IDCT: inverse discrete cosine transform; Q: quantization; Q^-1: inverse quantization; CP: clipping; FM: find maximum significant bit in bit-plane; BP: bit-plane VLC; IN: input block, frame is input data type; OUT: output block, an encoded bit stream for two frames; MB: macroblock, prepare for DCT; DCPE: DC coefficient predication encoding block; ACE: AC coefficients coding block; FA: frame accumulation block; ME: motion estimation block; MC: motion compensation block; DA: DC/AC coefficient encoding block