Presentation on Low Bit Rate Video Coding in MPEG-4

Chad Roesle

Kurt Nee

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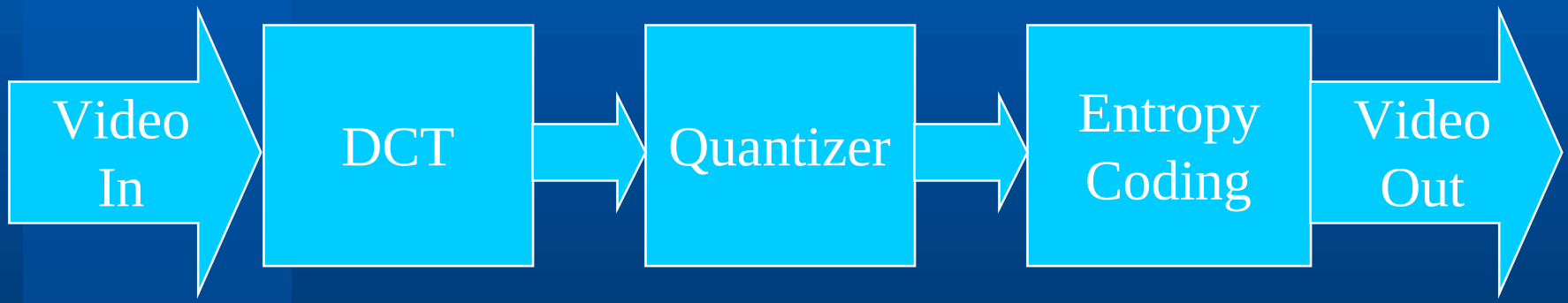
Very Low Bit Rate MPEG-4

- **Highly interactive**
  - **User can add, delete, move, or manipulate objects in the scene**
- **Easily scalable**
  - **automatic adjustment for bandwidth**
  - **from HDTV down to wireless**
  - **minimal hardware requirements**
- **Error resistant**
  - **Resync markers**
  - **Backwards decoding**
- **Bandwidth conservation**
  - **Sprites**
  - **Prioritized objects**
  - **Layered streams**

H.263+: Video Coding at Low Bit Rates

- **H.263+ adds 12 additional optional modes**
  - **Unrestricted Motion Vector Mode**
  - **Slice Structured Mode**
  - **Temporal, SNR, and Spatial Scalability Mode**
- **Negligible computational expense**
- **Real-time software decoding possible**
- **No “all-in-one” mode**
- **Can combine modes**

Diagram of Basic Video Coder



Low Bit Rate Coding Statistics

- **12 - 48kbps**
- **I frame consumes 40 - 70% of total bit rate**
- **P and B frames depend heavily on efficiency of I frame**

Y. Jeong, et al

New Coding Technique

- **I (intra) frame coding**
- **Recognition of wavelet structure of DCT**
- **93-99% of energy in 0 subband**
- **Entropy coding**

Y. Jeong, et al

Error Resilience in H.263+

- **Forward error correction mode**
- **Slice-structured mode**
- **Independent segment decoding mode**
- **Reference picture selection mode**

S. Wenger, et al

Conclusion

- **Briefly explained low bit rate video coding for MPEG-4**
- **Will use Ptolemy to model simple H.263+ encoder**
  - **Deblocking filter**
  - **Error resilience**
  - **Efficient coding algorithm**