

DESKTOP VIDEO ACTIVITIES

Group: Advanced Applications

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PURPOSE

- **Advanced Applications** researches, evaluates, and develops advanced desktop video applications

Projects

- **Low bitrate video coding (LBV) for networked video such as videoconferencing, distance learning, and video on demand.**
- **High quality video (e.g. MPEG-2) over high speed networks (e.g. ATM)**
 - **Better compression of high quality video (see above)**
 - **Scalable video coding (e.g. scalable modes in MPEG-2) for interfacing high speed and regular networks.**

Low Bitrate Video

- **Digital video networking applications such as desktop videoconferencing place very high demands on the bandwidth of Wide Area Networks, Local Area Networks, ISDN lines, and conventional phone lines. One solution is to replace existing communications infrastructure with faster, higher bandwidth communications networks. A complementary solution is to find or develop improved video compression to reduce the bandwidth requirements.**
- **The low bitrate video (LBV) coding project seeks to evaluate the limitations of existing and future image and video compression technologies. Many claims of much better performance than block DCT video codecs exist.**

Algorithms To Be Studied

- **JPEG still image compression (reference point)**
- **H.261 video compression standard (reference point)**
- **H.263 and H.263+**
- **MPEG-4**
- **Wavelet Image and Video Coding**
- **Fractal Image and Video Coding**
- **Model based Video Coding**
- **Image Segmentation based Video Coding**
- **Other Advanced Video Coding**

Low Bitrate Video : Phase One

- **Independent evaluation of working image or video compression using commercial products or experimental prototypes (e.g. research tools available on Internet) with test images and video clips chosen to be representative of actual network applications.**
- **“Gallery” of compressed/decoded images and video clips illustrating performance of different image/video compressors.**
- **Determination if any of the technologies is significantly superior to H.261 or JPEG/MPEG (block DCT based codecs).**
- **Starting with Infinop’s Lightning Strike**
- **Lightning Strike claims to be a wavelet based compression superior to JPEG**

Preliminary Results

- **Some pictures comparing JPEG and Lightning Strike on test videoconferencing stills taken with Intel's ProShare.**



Original Still Image

Going Too Far



**JPEG at 88.5:1
Quality 1**



**Lightning Strike 2.6 at 125:
Quality 10**

48:1



**JPEG
Quality 10**



**Lightning Strike 2.6
Quality 19**

24.5 : 1



**JPEG
Quality 35**



**Lightning Strike 2.6
Quality 54**

14.3 : 1



**JPEG at 14.3 : 1
Quality 75
(Default)**



**Lightning Strike 2.6 at 14.3: 1
Quality > 50**

Tools Used

- **JPEG Encoder Built Into GIF Converter**
 - 1-100 quality setting, defaults to 75
 - Mac shareware
 - JPEG is block Discrete Cosine Transform based compression
- **Lightning Strike 2.6 Photoshop Plug-In (Mac)**
 - Claims to be wavelet based image compression
- **Adobe Photoshop 3.0 on Mac to convert image formats.**
 - All pictures in this presentation are PICT files
 - Lossless
 - Show byte accurate output of JPEG or Lightning Strike decoder
- **FileTyper on Mac to verify compressed file sizes.**