Compressible Motion Fields

Supplementary material

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1 Introduction

This supplementary document contains details that were omitted from the main paper due to lack of space: instructions to obtain the original uncompressed sequences used in the experiments, the command line used to produce the Dirac rate-distortion plots, and examples from the test sequences.

2 Uncompressed sequences

All the sequences were downloaded from `http://media.xiph.org/video/derf/`. The sequences `foreman`, `news`, `highway`, `bus`, `flower`, `soccer`, and `football` were used as downloaded. `sintel` was cropped to remove letterboxes and the first 6 seconds (containing titles) were skipped. The sequence can be obtained by downloading the 480p Sintel trailer from the site above and running the following line with `ffmpeg`:

```
ffmpeg -i sintel_trailer_2k_480p24.y4m -ss 00:00:06.25 -t 00:00:02 \
    -vf crop=832:352:0:64 sintel.yuv
```

3 Dirac command line

For the Dirac comparisons we used the latest revision of the Dirac encoder available at the time of writing, downloadable from `http://diracvideo.org/git?p=dirac-research.git;a=tree;h=c99cf8d2cb1e9e69b464f4df2dcae9f9baab49dc`.

We used the following command line for all the sequences:

```
EncodeDirac -width <width> -height <height> -cformat YUV420P \
    -verbose -local -L1_sep 1 -num_L1 25 -stop 24 -qf <quality> <filename>
```

*Part of the work done while the author was an intern at Microsoft Research, Cambridge.

4 Frame examples

We show here the last frame for each of the sample sequences included. The last frame is the most affected by the accumulation of error in predicted frames, so it is indicative of the overall compression quality. For each frame we include its PSNR and the number of bits needed to encode it.

We add Dirac to the comparison. Note that the output of Dirac is consistently more noisy and less pleasing than the output of HS and L1Log-WQ, despite having similar PSNR. Except for bus, HS and L1Log-WQ obtain smaller frame sizes than Dirac, and L1Log-WQ is always smaller than HS.

foreman

Original

Dirac
Frame bits: 51960
PSNR: 39.729

HS
Frame bits: 50008
PSNR: 39.548

L1Log-WQ
Frame bits: 43872
PSNR: 39.581

news

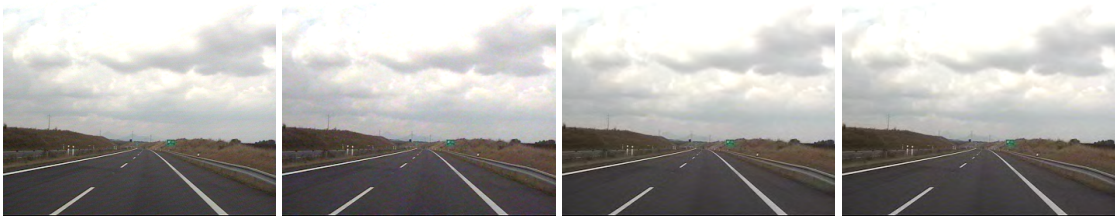
Original

Dirac
Frame bits: 18280
PSNR: 38.956

HS
Frame bits: 15176
PSNR: 39.639

L1Log-WQ
Frame bits: 14352
PSNR: 39.650

highway



Original

Dirac
Frame bits: 48192
PSNR: 39.892

HS
Frame bits: 25408
PSNR: 40.174

L1Log-WQ
Frame bits: 22224
PSNR: 40.008

sintel

Original

Dirac
Frame bits: 33136
PSNR: 39.673

HS
Frame bits: 25824
PSNR: 40.247

L1Log-WQ
Frame bits: 21320
PSNR: 40.858

bus

Original

Dirac
Frame bits: 125432
PSNR: 39.923

HS
Frame bits: 139232
PSNR: 40.087

L1Log-WQ
Frame bits: 131744
PSNR: 40.129

flower

Original

Dirac
Frame bits: 92072
PSNR: 39.632

HS
Frame bits: 88008
PSNR: 39.753

L1Log-WQ
Frame bits: 82632
PSNR: 39.735

soccer

Original

Dirac
Frame bits: 407272
PSNR: 39.087

HS
Frame bits: 250712
PSNR: 39.663

L1Log-WQ
Frame bits: 243328
PSNR: 39.663

football

Original

Dirac
Frame bits: 165264
PSNR: 39.558

HS
Frame bits: 167032
PSNR: 41.014

L1Log-WQ
Frame bits: 157464
PSNR: 41.039