Multimedia Datenformate
Projekttitel

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Inhalt

Intro

General incentive of this assignment:

„Is it possible to effectively apply **video compression** for almost identical **pictures**?“

→ can we achieve *better* results with video compression than with image compression?
→ which codec is best suited for our purposes?
→ how does the change of video codec parameters affect the results?
→ how to determine the quality of the results?

Dataset

The database consists of finger vein images of different fingers of different persons

- 6 fingers per person, with 4 pictures per finger $\rightarrow$ 24 pictures per person
- 60 persons at all - - - 60 korrekt ?? - - -
- we worked with a subset of those

- - - Platzhalter Fingervenen Bilder - - -

JPEG2000

- used as a baseline for comparison
- standard encoding settings, except number of layers
- ImageMagick with integrated OpenJPEG library

Video Compression

Why video compression?

Video Compression

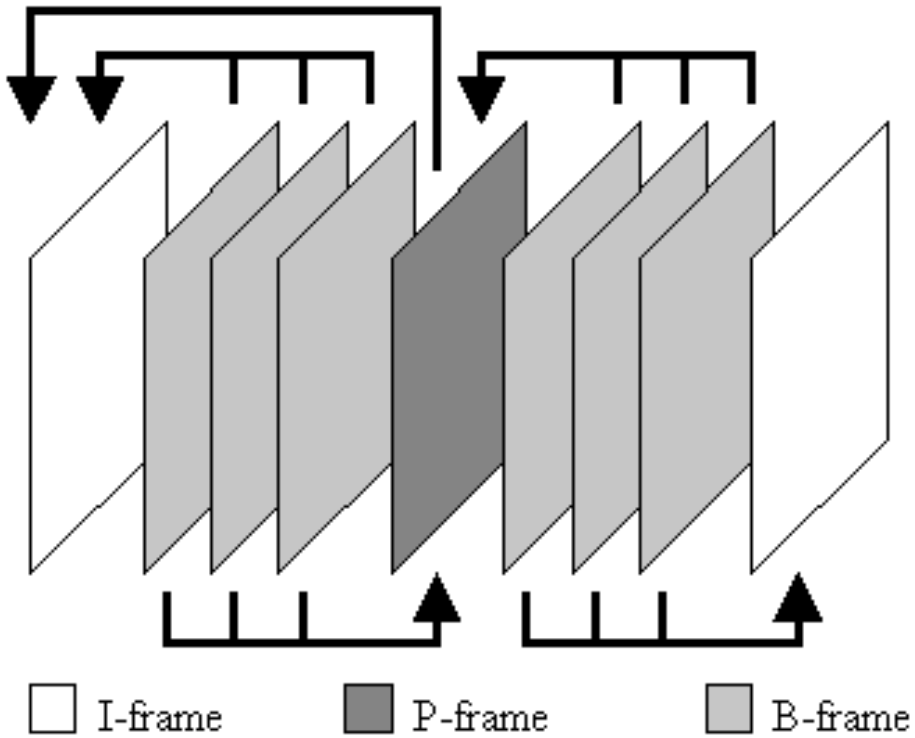
Why video compression?

- Very similar images
- Image compression only compresses individual images
- Video compression does 2 things:
  1. Compresses images
  2. Exploits similarities between images

I,P,B-Frames

3 different types of pictures

- I-Frame: Intra-coded picture
- P-Frame: Predictive-coded picture
- B-Frame: Bidirectional predictive-coded picture



Group Of Pictures

- usually defined with two numbers
  1. defines distance of two I-Frames
  2. defines distance of two anchor frames (I or P)
- we used GOP to adapt the encoding to the database
  - 24 pictures per person: use GOP 24 $\rightarrow$ 1 I-Frame per person
  - 4 pictures per finger: use GOP 4 $\rightarrow$ 1 I-Frame per finger
- P- and B-Frames allow higher compression $\rightarrow$ GOP affects the compression rate

Subsection 1

Testtext 2.1

CRF

- CRF value (Constant Rate Factor)
  1. The range of the quantizer scale is 0-51
  2. A lower value means better quality (0 for best quality, lossless)
  3. default value is 23
  4. A higher value means bad quality (51 for worst quality)

Presets

- presets (they provide a certain encoding speed)
  1. ultrafast , superfast , veryfast , faster , fast
  2. medium (default)
  3. slow, slower, veryslow, placebo
  4. we focused more to the slower presets (medium-veryslow)

Settings

- what are the settings behind them?

slow	slower	veryslow
–b-adapt 2	–b-adapt 2	–b-adapt 2
–direct auto	–direct auto	–direct auto
default	default	–bframes 8
–me umh	–me umh	–me umh
–rc-lookahead 50	–rc-lookahead 60	–rc-lookahead 60
default	–partitions all	–partitions all
default	default	–merange 24
–ref 5	–ref 8	–ref 16
–subme 8	–subme 9	–subme 10
default	–trellis 2	–trellis 2

Settings

- quick explanation of the settings :
  - –rc-lookahead "Frames":
    - amount of macroblocktree and VBV algorithms
    - higher value means that more memory and time is required
  - –b-adapt "Mod":
    - algorithm for the adaptive distribution of B-frames
    - values : 0,1,2
  - –direct "Mod":
    - temporal or spatial information is used in B frames
  - –bframes "Max":
    - Defines how many B-frames can be positioned directly behind each other
    - values are between 0 and 16 (3 is default)
  - –me "mod":
    - Algorithm for motion search

Settings

- –partitions "partitions":
  - partition size for macroblocks
- –merange "radius":
  - size of the area
- –ref "frames":
  - amount of valid reference frames
- –subme "quality":
  - Defines the quality level for the subpixel motion search and the partition decision

JPEG2000 Compression

Video Compression

Setup:

- Used ffmpeg v.3.3.2 (latest version)
- Compressed 240 images
- Different crf values (0-50)
- Varying group of pictures (1, 4, 24)
- two presets (medium, veryslow)

Video Compression

Repeat for each (crf, gop, preset) - combination

1. Compress images into single video
2. get videosize (for compression rate)
3. Decompress video $\rightarrow$ get images
4. Put into folder named with settings

Additional steps

- Collect image names $\rightarrow$ parameters for matcher
- rename decompressed videos

Matching