

P(5-1)

a) ~~Code Contest?~~

• Motion Compensated Predictor

• Motion Estimator

b) • Color Transform/Sampling: ICT (YCbCr)

• Transform/Quantize: Scalar Quantize / Vector Quantize
DCT / ZigZag / ZRE

• Entropy Coding: Marg. Ent. / Joint Entropy /
Huffman Coding

• Deq / Inv Trans: DeZigZag / DeZRE / DeKt /
DeQuant // DCT

Number of block comparison

P(5-2) a)

Assume block for the inner part of the image

for corners: $(m+1)^2$
margins (not corners): $(m+1) \cdot (2m+1)$

block comparisons

SSD: $\sum_{\text{block}} [S_k(x, y) - S_{k-1}(x+dx, y+dy)]^2$

→ $m-1$ Additions per Block
 $(2m+1)^2 \cdot (m-1)$ Additions for full search

→ m^2 Subtractions per Block
 $(2m+1)^2 \cdot m^2$ Subtractions for the full search

→ same for Multiplications

b) Number of Block Comparison

$$\text{SAD}(dx, dy) = \sum_{\text{block}} |S_k(x, y) - S_{k-1}(x+dx, y+dy)|$$

→ Number of Additions and Subtractions stay the same

→ For Multiplications we have to make a case distinction:

Best Case: 0 Multiplications

Worst Case: m^2 Multiplications (per Block)

Full Search

P(5-3)

Number of candidate motion vectors per search area:

For an image of size $k \times l$ and for blocks of size $m \times n$

Size of matrix: $\frac{k}{m} \times \frac{l}{n}$

→ $(\frac{k}{m} \cdot \frac{l}{n})$ potential motion vectors

Number of motion vectors per CIF Frame:

CIF (352 x 288)

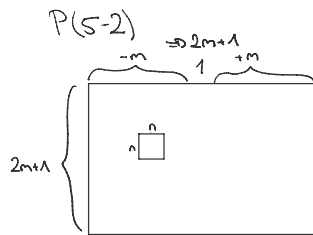
$\frac{352}{m} \times \frac{288}{n}$ for $m \times n$ blocks

→ $(\frac{101376}{m \cdot n})$ potential motion vectors

↓ with block size of 8

Number of candidate
motion vectors per search area: $\frac{k}{64}$ ← image sizes

Number of motion vectors
per CIF Frame $\frac{352 \cdot 288}{64} = 1584$



$$SSD: \sum_{\text{block}} [S_k(x, y) - S_{k-1}(x + d_x, y + d_y)]^2$$

A full search is $(2m+1)^2$ block comparison