

Efficient Error-resilient Video Compression by Using Optimal Distribution of Intra/Inter Macroblocks for Multi-State Coding

-Dynamic mode-tune in MSC for faster error recovery

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Outline

- ◆ Optimal Mode Selection
- ◆ Multiple State Coding
- ◆ Dynamic Mode Tune for faster recovery
- ◆ Experimental Results
- ◆ Conclusion and Future Work

Optimal Mode Selection

- ◆ Rate-constrained distortion

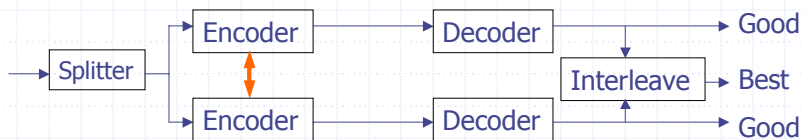
$$J_{\text{mode}} = D_{\text{mode}} + \lambda R_{\text{mode}}$$

- ◆ RD with packet loss and error concealment consideration

$$J_{\text{mode}} = (1-p)D_{q,\text{mode}} + p D_{c,\text{mode}} + \lambda R_{\text{mode}}$$

Multiple State Coding (MSC)

- ◆ MSC



- ◆ Error Recovery



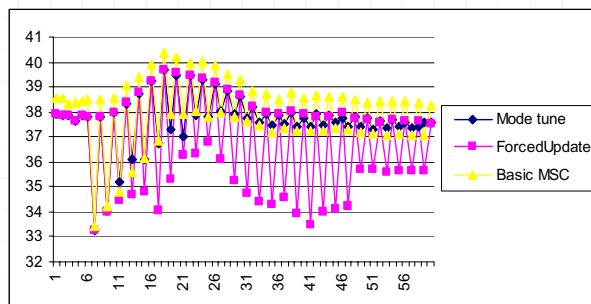
Dynamic Mode Tune

- ◆ Content importance – Intra v.s. Inter
- ◆ Intra updating history – N_1, N_2
- ◆ Joint RD mode selection

$$J = \begin{cases} J_{\text{intra}} * \frac{1}{\max((N_1 + aN_2), L)} \\ J_{\text{inter}} * \frac{1}{L} \end{cases}$$

Experimental Results

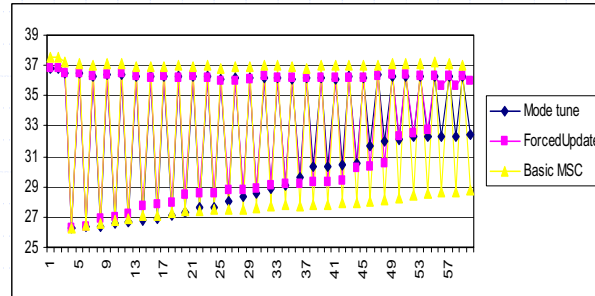
Scheme	QP (I/P)	R (kbps)
Mode Tune	16/15	245.26
Forced Update	16/15	232.51
Basic MSC	15/14	257.88



Suzie Sequence, R ≈ 250 kbps, loss of frame 6

Experimental Results – cont.

Scheme	QP (I/P)	R (kbps)
Mode Tune	16/15	216.17
Forced Update	16/15	212.45
Basic MSC	15/14	224.87



Foreman Sequence, $R \approx 210$ kbps, loss of frame 3

Conclusion and Future Work

- ◆ Noticeable performance for high motion content sequence
- ◆ Does not always outperform the periodic intra-coded GOB update
- ◆ Two configurable parameters a and L need to be better defined
- ◆ A more complex joint RD scheme