

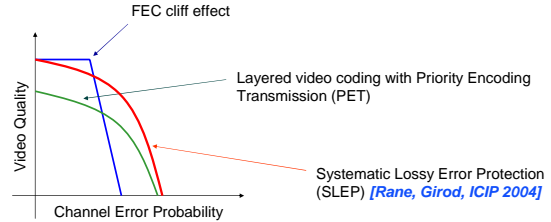
Error-Resilient Video Transmission Using Multiple Embedded Wyner-Ziv Descriptions



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Limitations of Traditional Error-Resilience Methods



**Main idea: Embed Wyner-Ziv descriptions for superior
resilience-quality trade-off**

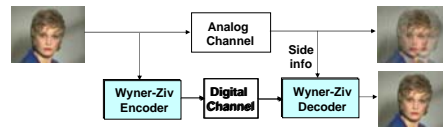
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Outline

- ❑ Systematic lossy source-channel coding
- ❑ Systematic Lossy Error Protection (SLEP) scheme with multiple embedded Wyner-Ziv descriptions
- ❑ Experimental comparison of SLEP and FEC

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Systematic Lossy Source-Channel Coding

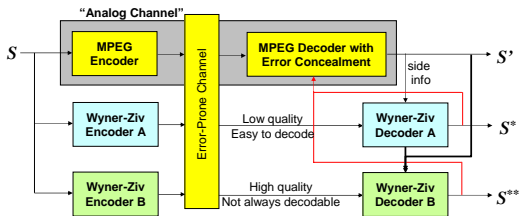


[Shamai, Verdú, Zamir, 1998]

- ❑ Enhancing analog image transmission using digital side information [Pradhan, Ramchandran, 2001]
- ❑ Error-resilient distributed video compression schemes [Sehgal, Ahuja, 2003-04], [Xu, Xiong, 2004]
- ❑ Lossy source-channel coding of video waveforms [Aaron, Rane, Girod, 2003-04]

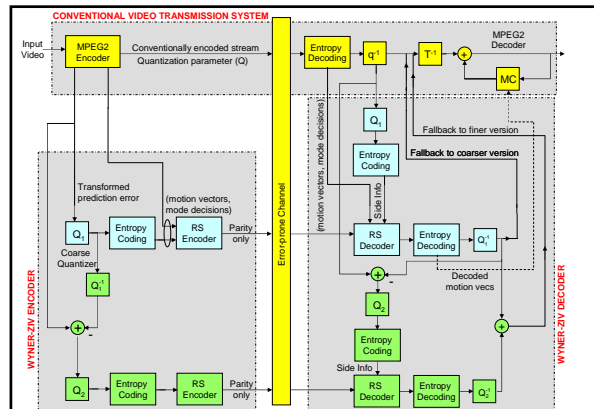
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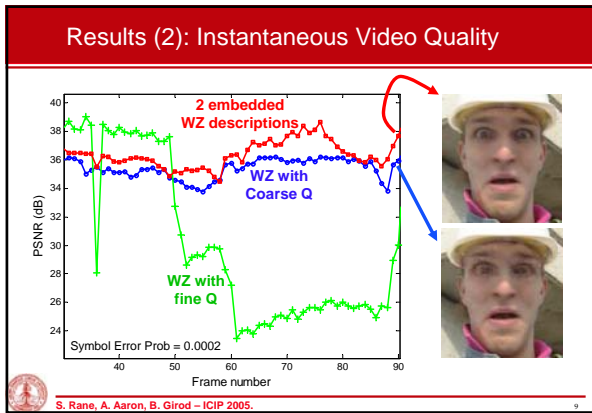
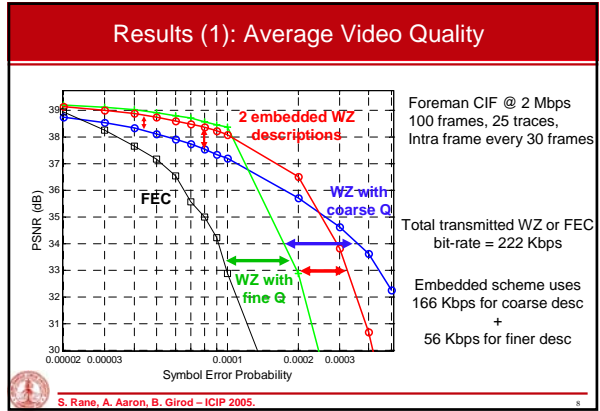
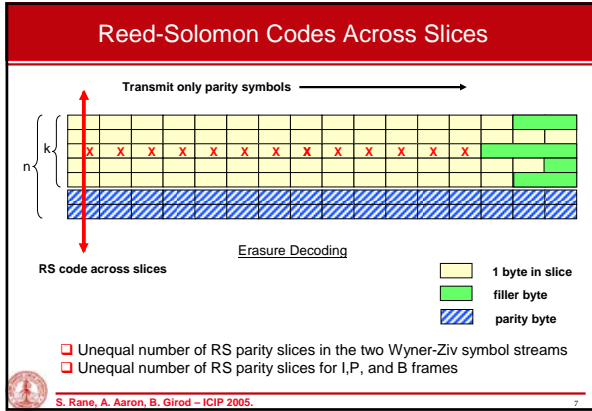
Embedded Wyner-Ziv Codec



- ❑ Choose between coarse WZ description A and fine WZ description B [ICIP 04]
- ❑ Embed coarse description A inside finer description B. Decode description A first and use it to decode refined description B, if permissible

S. Rane, A. Aaron, B. Girod – ICIP 2005.





- ### Summary
- ❑ Practical SLEP scheme for error-resilient digital video transmission
 - ❑ Exploit resilience-quality trade-off with embedded WZ descriptions
 - ❑ Superior picture quality compared to FEC over a wide range of error rates
 - ❑ Graceful quality degradation but without a layered signal representation in the systematic transmission
- Outlook:** Efficient implementation of SLEP using H.264 Redundant Slices
- S. Rane, A. Aaron, B. Girod – ICIP 2005.