



上海交通大学
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Lossless Compression for Video Streams with Frequency Prediction and Macro Block Merging

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Background & Motivation



□ Background:

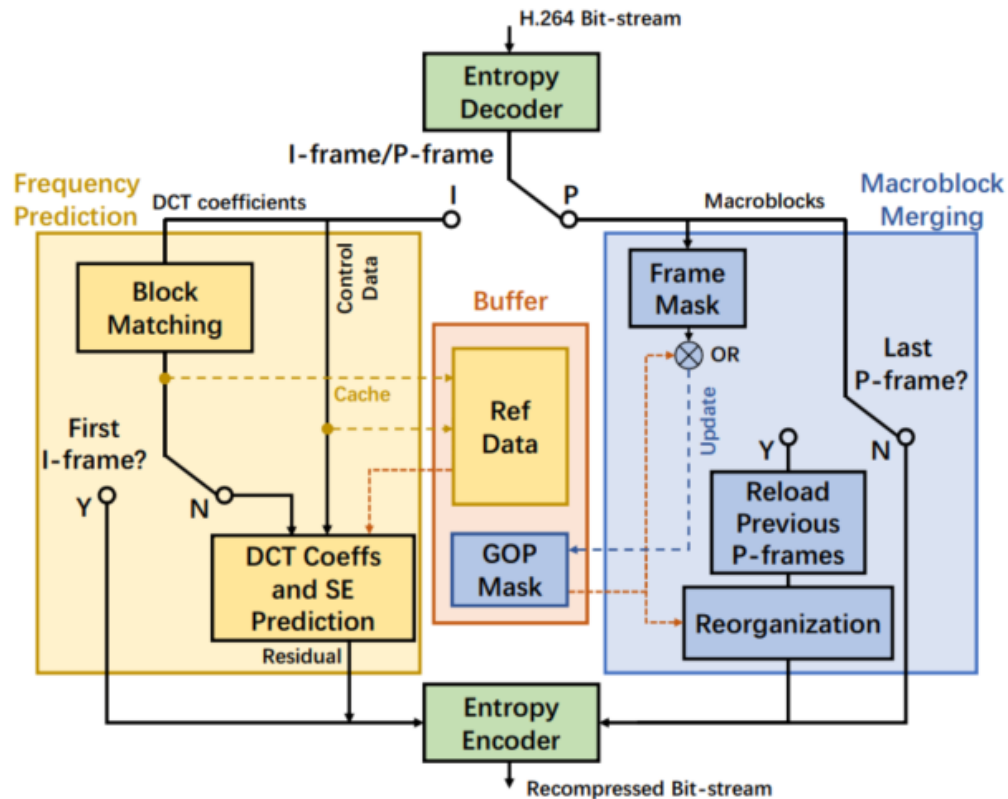
- Increasing videos and resolution about surveillance, live and game
- Videos are encoded and video streams are uploaded into cloud

□ Motivation:

- There exist a large number of similar backgrounds for surveillance and live videos
- There exists redundancy among syntax elements



Methods



□ Frequency Prediction

- Block Matching
- DCT coefficients and syntax elements prediction

□ MacroBlock Merging:

- Frame mask
- Mask merging by exclusive OR operation
- Block merging

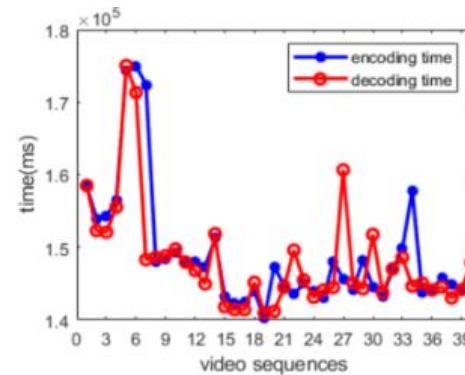
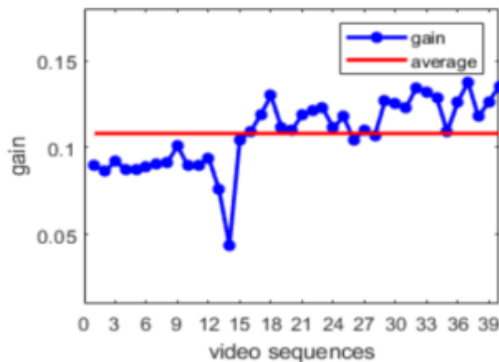


Results

- Compression gain for standard sequences:

Sequences	Resolution	QP			
		24	28	32	36
<i>Foreman</i>	352 × 288	6.9996%	9.1850%	12.5352%	17.4210%
<i>Akiyo</i>		28.6565%	32.7690%	34.3675%	43.4034%
<i>Flower</i>		7.9268%	13.2205%	21.4599%	27.2822%
<i>Stefan</i>		18.3255%	23.3760%	27.5880%	29.9774%
<i>BQSquare</i>	416 × 240	1.5310%	1.3786%	1.3792%	2.0887%
<i>RaceHorses</i>	832 × 480	9.5322%	14.5031%	17.3829%	15.7852%
<i>ParkRun</i>	1280 × 720	10.6632%	14.5549%	19.0532%	22.7225%
<i>ChristmasTree</i>	1920 × 1080	12.8606%	14.9037%	19.8691%	23.3088%
<i>Average</i>		12.0619%	15.4864%	19.2044%	22.7487%

- Compression gain for surveillance sequences:



Outlook

□ General lossless compression:

- This paper only targets into videos with less motion, such as surveillance videos.
- More powerful lossless compression tools are designed for motion or texture context.
- ...

□ Nearly lossless compression:

- This paper is strictly lossless for video bitstreams.
- Visually lossless technology is also important for some devices
- ...





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Thanks

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