

画像情報特論 (1)

Advanced Image Information (1)

はじめに

Class Overview

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This Year's Schedule

(tentative)

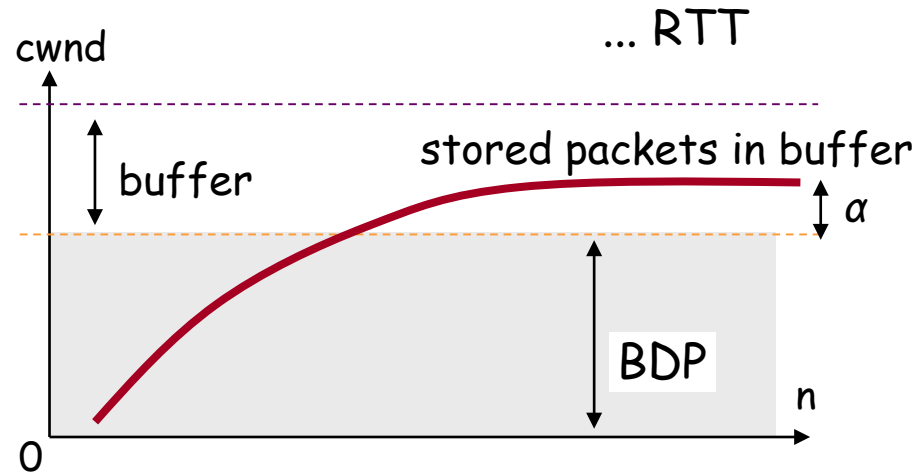
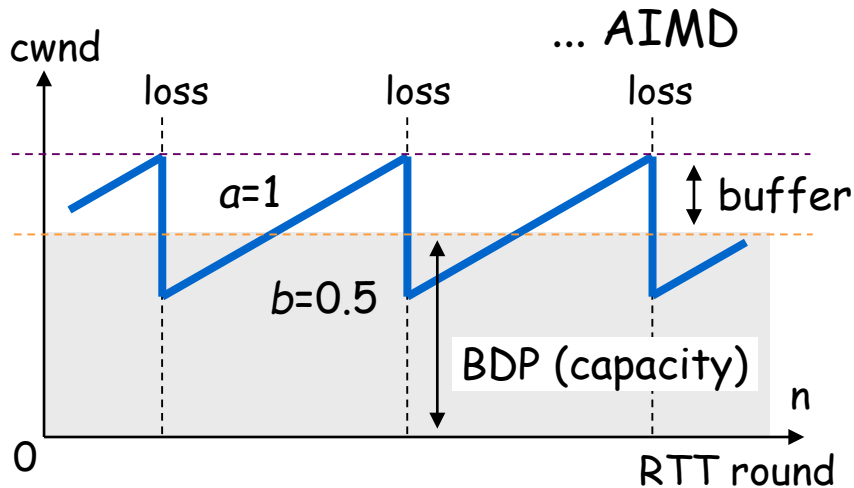
- 4/12 Class overview, Video Streaming (1)
- 4/19 Self study
- 4/26 Video Streaming (2)
- 5/10 Video Streaming (3)
- 5/17 Video Streaming (4)
- 5/24 Video Streaming (5)
- 5/31 Video Streaming (6)
- 6/07 Video Compression (1)
- 6/14 Video Compression (2)
- 6/21 Video Compression (3)
- 6/28 Video Compression (4)
- 7/05 Image Processing (1)
- 7/12 Image Processing (2)
- 7/19 Image Processing (3)
- 7/26 Final report

And, additional self studies on CourseN@vi,

Video streaming (1) TCP/IP

■ Loss-driven

■ Delay-driven



TCP-Reno, High-Speed TCP,
TCP-Westwood, CUBIC-TCP, ...

TCP-Vegas, FAST-TCP

BDP/Buffer relationship

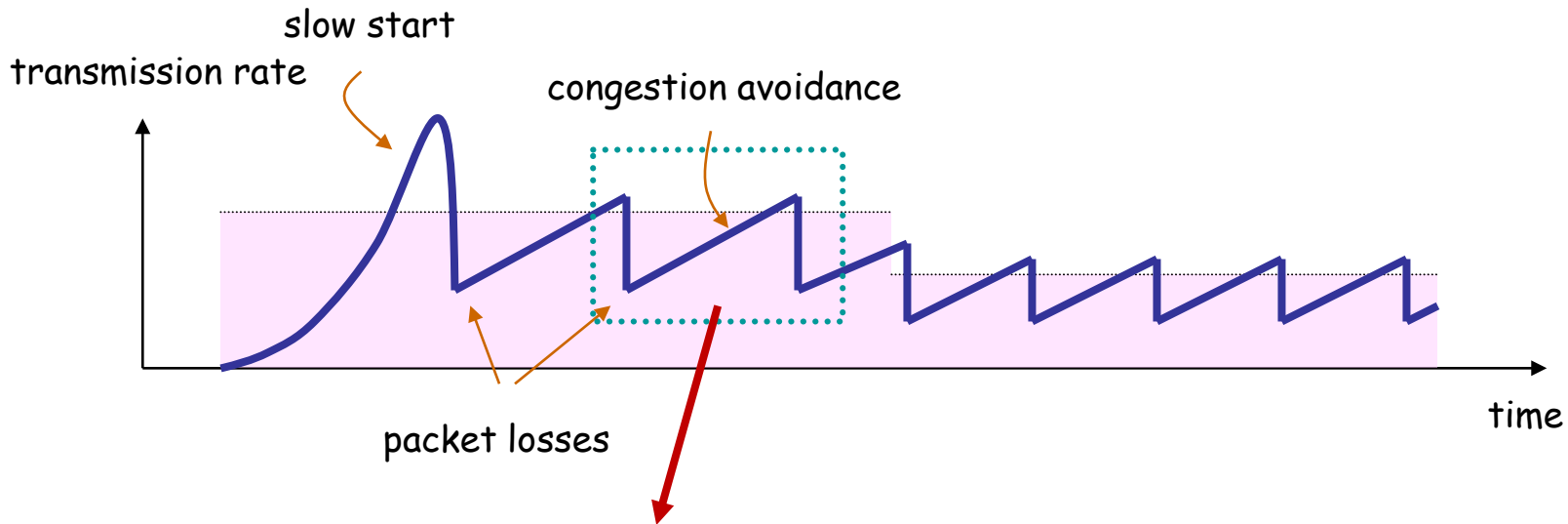
Unfairness by loss-driven TCP

small buffer \rightarrow \times efficiency
large buffer \rightarrow \times delay

\times friendliness

Video streaming (2) TFRC

■ TFRC (over RTP/UDP)



Modeling of steady-state
TCP behaviors

$$R = \frac{1}{RTT} \sqrt{\frac{3}{2p}}$$

p: packet loss rate

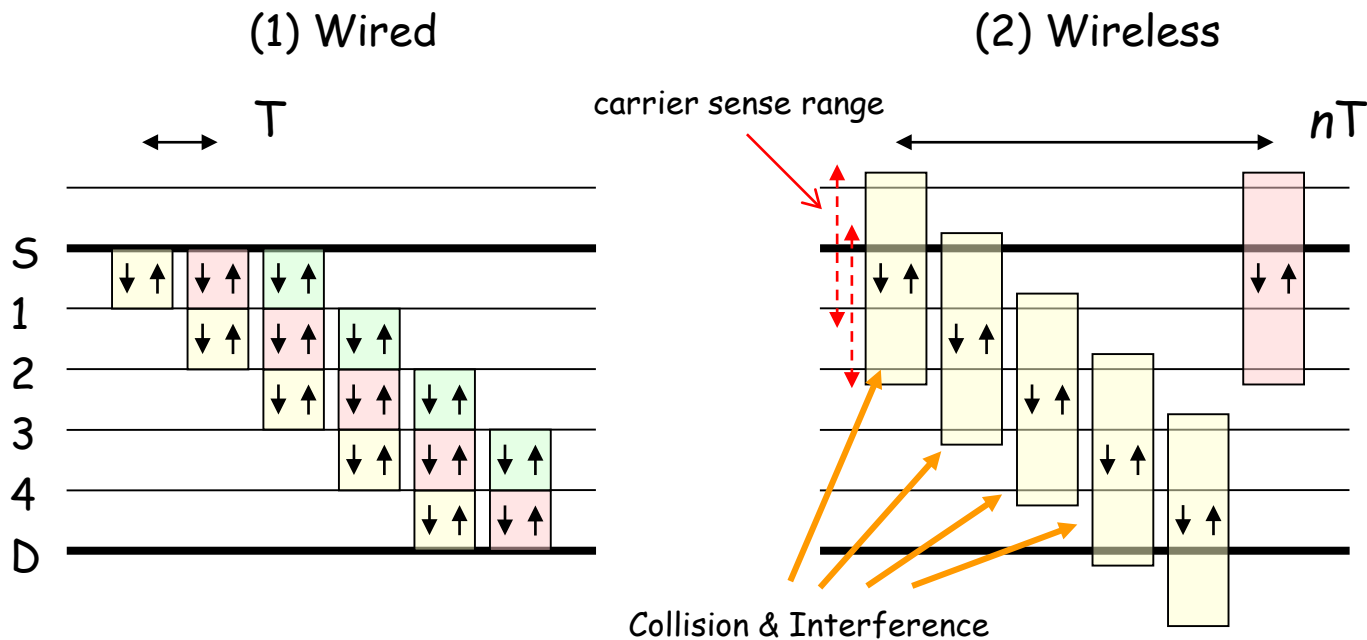
BDP/Buffer relationship

small buffer → × efficiency
large buffer → × delay



Video streaming (3) Wireless

■ Single-Channel Multi-hop Network



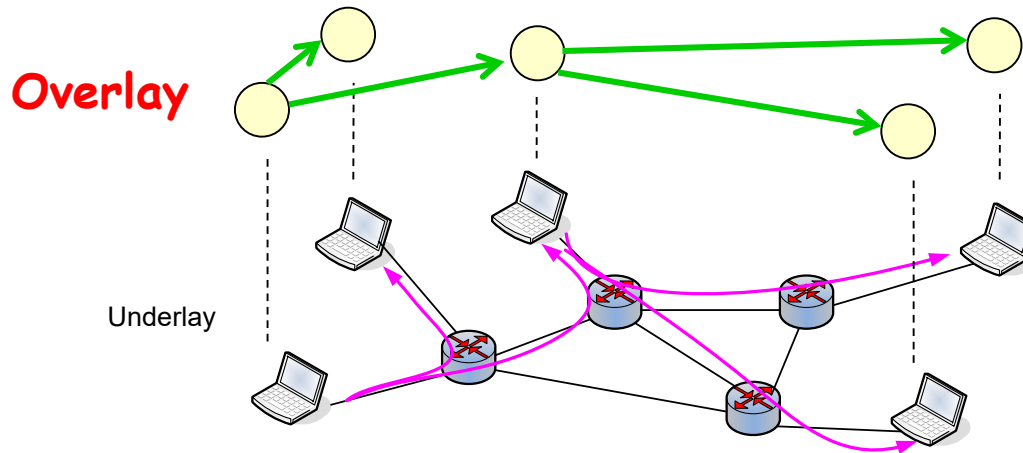
Channel Efficiency = 1



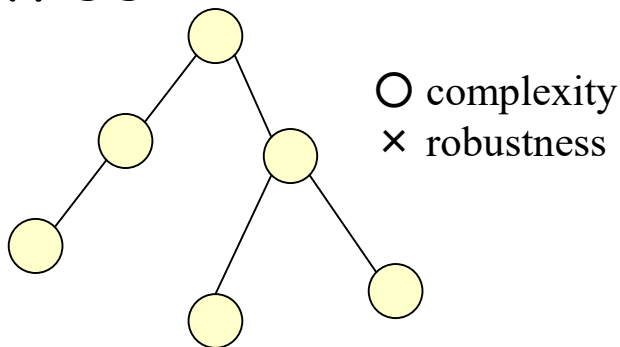
Channel Efficiency = $1/n$
(n : # of multi-hops)

Video streaming (4) CDN, P2P & Cloud

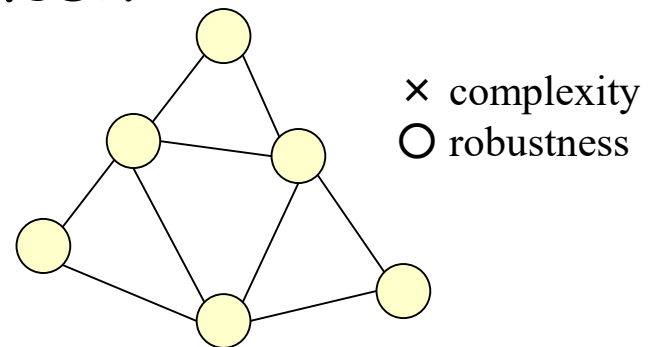
■ Overlay networks



■ tree



■ mesh



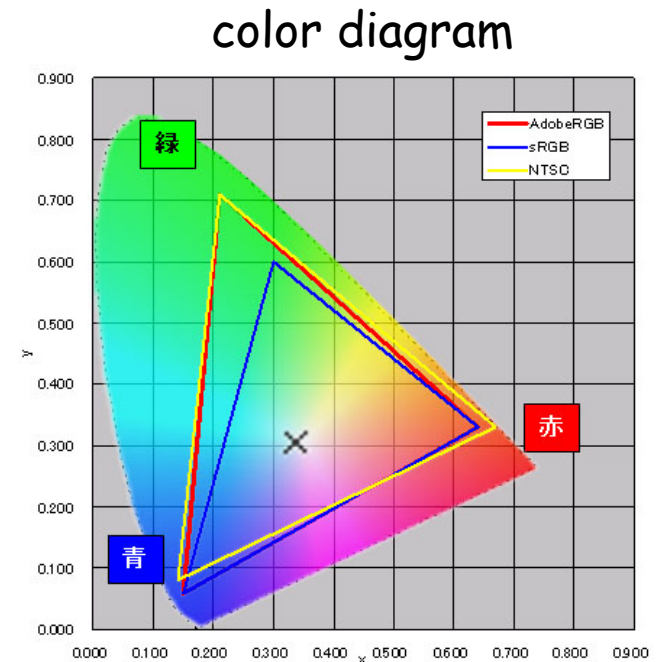
Video Compression: H.265 & Beyond

■ HEVC & VVC

- HEVC: High Efficiency Video Coding (H.265)
- VVC: Versatile Video Coding (H.266)

■ Other topics

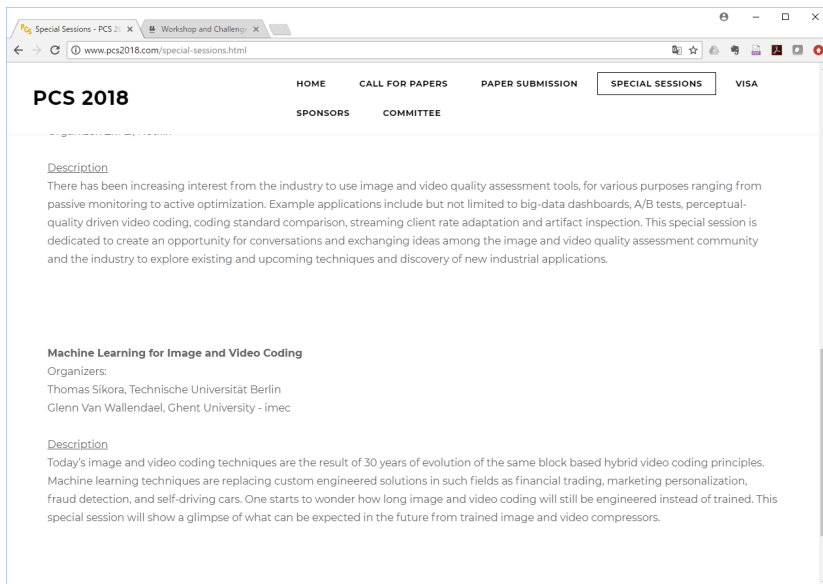
- Higher resolution
 - spatial: U-HDTV
 - temporal: 10,000 frames
- Wide gamut expansion
- High dynamic range
- 3D / freeviewpoint



Machine Learning in Image/Video Compression

- On-going in these three years

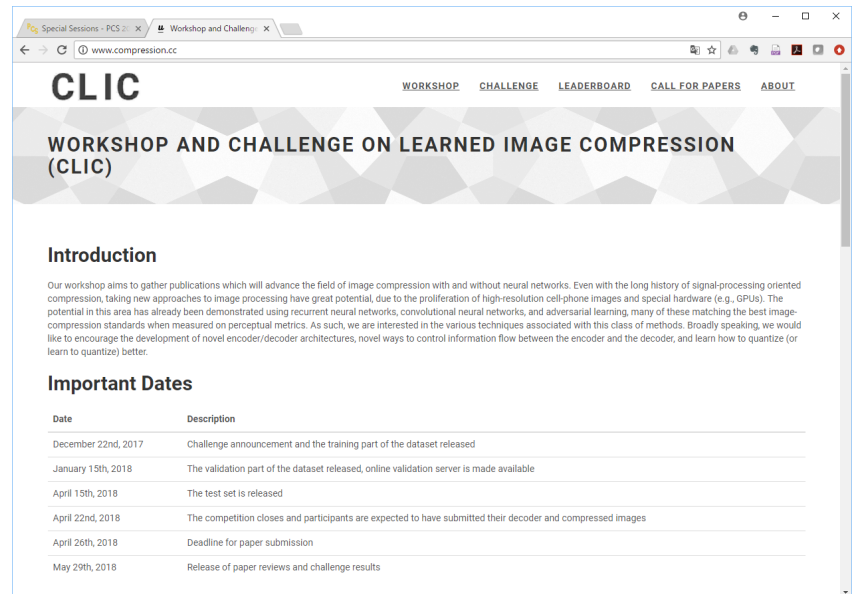
PCS 2018 in June



The screenshot shows the website for PCS 2018. The URL is www.pcs2018.com/special-sessions.html. The page has a navigation menu with links for HOME, CALL FOR PAPERS, PAPER SUBMISSION, SPECIAL SESSIONS (which is highlighted), and VISA. Below the navigation, there is a section for "Special Sessions" with a "Description" link. The description text reads: "There has been increasing interest from the industry to use image and video quality assessment tools, for various purposes ranging from passive monitoring to active optimization. Example applications include but not limited to big-data dashboards, A/B tests, perceptual-quality driven video coding, coding standard comparison, streaming client rate adaptation and artifact inspection. This special session is dedicated to create an opportunity for conversations and exchanging ideas among the image and video quality assessment community and the industry to explore existing and upcoming techniques and discovery of new industrial applications." Below this, there is a section for "Machine Learning for Image and Video Coding" with organizers Thomas Sikora and Glenn Van Wallendael. Another "Description" link is present at the bottom of the page.

<http://www.pcs2018.com/>

CLIC in CVPR 2018 in June



The screenshot shows the website for CLIC. The URL is www.compression.cc. The page has a navigation menu with links for WORKSHOP, CHALLENGE, LEADERBOARD, CALL FOR PAPERS, and ABOUT. Below the navigation, there is a section for "CLIC" with a "WORKSHOP AND CHALLENGE ON LEARNED IMAGE COMPRESSION (CLIC)" header. The page includes an "Introduction" section, an "Important Dates" section, and a table of dates and descriptions.

Date	Description
December 22nd, 2017	Challenge announcement and the training part of the dataset released
January 15th, 2018	The validation part of the dataset released, online validation server is made available
April 15th, 2018	The test set is released
April 22nd, 2018	The competition closes and participants are expected to have submitted their decoder and compressed images
April 26th, 2018	Deadline for paper submission
May 29th, 2018	Release of paper reviews and challenge results

<http://www.compression.cc/>

Handouts

- Check handouts on CourseN@vi.
- (in April) check class web page
 - <http://www.katto.comm.waseda.ac.jp/~katto/Class/>