MSU Video Codecs Comparison 2020

Video Set Description

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http://www.compression.ru/video/codec_comparison/index_en.html

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A. SEQUENCES

A.1. ac_origins

Sequence title	ac_origins
Resolution	1920×1080
Number of frames	900
Color space	YV12
Frames per second	30
Source	https://vimeo.com/243716358#t=0
Source resolution	FullHD
Bitrate	993.84

Video game commercial with 2D animation and in-game footage.

Figure 1: ac_origins sequence, frame 730

A.2. aerial_media

Sequence title	aerial_media
Resolution	1920×1080
Number of frames	968
Color space	YV12
Frames per second	30
Source	https://vimeo.com/171811620#t=65
Source resolution	FullHD
Bitrate	80.0

Aerial shots of mountain landscape.

Figure 2: aerial_media sequence, frame 342

A.3. alt_rock

Sequence title	alt_rock
Resolution	1920×1080
Number of frames	480
Color space	YV12
Frames per second	24
Source	https://media.withyoutube.com/
Source resolution	FullHD
Bitrate	597.2

Translucent combination of a man playing guitar and car registrar shooting. YouTube UGC id: Musicvideo_1080P-7f2e

Figure 3: alt_rock sequence, frame 171

A.4. apple_tree

Sequence title	apple_tree
Resolution	1920×1080
Number of frames	338
Color space	YV12
Frames per second	30
Source	
Source resolution	FullHD
Bitrate	746.5

Camera zooms out from an apple tree with an average speed.

Figure 4: apple_tree sequence, frame 5

A.5. ariadnes_thread

Sequence title	ariadnes_thread
Resolution	1920×1080
Number of frames	902
Color space	YV12
Frames per second	30
Source	https://vimeo.com/234495532#t=68
Source resolution	FullHD
Bitrate	219.2

A woman is dancing then another woman appears. Objects are highly textured and video contains flickering effects.

Figure 5: ariadnes_thread sequence, frame 200

A.6. beach_interview

Sequence title	beach_interview
Resolution	1920×1080
Number of frames	1001
Color space	YV12
Frames per second	30
Source	https://vimeo.com/248472558#t=0
Source resolution	FullHD
Bitrate	142.31

Aerial shooting of sea coast. Woman is speaking in front of camera.

Figure 6: beach_interview sequence, frame 178

A.7. bhutan

Sequence title	bhutan
Resolution	1920×1080
Number of frames	967
Color space	YV12
Frames per second	25
Source	https://vimeo.com/199662883#t=0
Source resolution	FullHD
Bitrate	118.74

Information video about Bhutan with landscapes and newspaper clippings.

Figure 7: bhutan sequence, frame 264

A.8. bsu_volleyball

Sequence title	bsu_volleyball
Resolution	1920×1080
Number of frames	600
Color space	YV12
Frames per second	30
Source	https://media.withyoutube.com/
Source resolution	FullHD
Bitrate	746.5

Volleyball game shooting. YouTube UGC id: Sports_1080P-679d

Figure 8: bsu_volleyball sequence, frame 587

A.9. chili_pepper

Sequence title	chili_pepper
Resolution	1920×1080
Number of frames	3576
Color space	YV12
Frames per second	60
Source	https://vimeo.com/87156909#t=0
Source resolution	FullHD
Bitrate	50.0

Ñcooking show, close shot of seething pan and fields with growing pepper.

Figure 9: chili_pepper sequence, frame 3225

A.10. christmas_cats

Sequence title	christmas_cats
Resolution	1920×1080
Number of frames	1500
Color space	YV12
Frames per second	25
Source	https://vimeo.com/192252473#t=0
Source resolution	FullHD
Bitrate	191.09

Concert record with superimposed complicated translucent CG effects.

Figure 10: christmas_cats sequence, frame 543

A.11. cineei_mode

Sequence title	cineei_mode
Resolution	1920×1080
Number of frames	971
Color space	YV12
Frames per second	30
Source	https://vimeo.com/118449345#t=142
Source resolution	FullHD
Bitrate	19.03

Macro shot of plant leaves.

Figure 11: cineei_mode sequence, frame 903

A.12. construction_site

Sequence title	construction_site
Resolution	1920×1080
Number of frames	1043
Color space	YV12
Frames per second	30
Source	https://vimeo.com/253861385#t=65
Source resolution	FullHD
Bitrate	78.08

Shots of building under construction.

Figure 12: construction_site sequence, frame 24

A.13. creek_cooler

Sequence title	creek_cooler
Resolution	1920×1080
Number of frames	1451
Color space	YV12
Frames per second	30
Source	https://vimeo.com/245462211#t=262
Source resolution	FullHD
Bitrate	139.44

Floating cooler commercial. Two men are speaking.

Figure 13: creek_cooler sequence, frame 1321

A.14. crowd_run

Sequence title	crowd_run
Resolution	1920×1080
Number of frames	500
Color space	YV12
Frames per second	50
Source	https://media.xiph.org/video/derf/
Source resolution	FullHD
Bitrate	1244.16

A crowd of sportsmen runs while the camera slowly moves left and right.

Figure 14: crowd_run sequence, frame 179

A.15. dusk_train

Sequence title	dusk_train
Resolution	1920×1080
Number of frames	1476
Color space	YV12
Frames per second	24
Source	https://media.withyoutube.com/
Source resolution	FullHD
Bitrate	175.96

Static twilight shooting of slowly moving train. YouTube UGC id: 87424136_1080P-0

Figure 15: dusk_train sequence, frame 331

A.16. fishing

Sequence title	fishing
Resolution	1920×1080
Number of frames	952
Color space	YV12
Frames per second	25
Source	https://vimeo.com/210061395#t=236
Source resolution	FullHD
Bitrate	115.68

A man shooting fishing on action camera.

Figure 16: fishing sequence, frame 244

A.17. flower_shop

Sequence title	flower_shop
Resolution	1920×1080
Number of frames	749
Color space	YV12
Frames per second	25
Source	https://vimeo.com/315459683#t=0
Source resolution	FullHD
Bitrate	221.51

A man and a woman arrange potted flowers in an open greenhouse.

Figure 17: flower_shop sequence, frame 84

A.18. football

Sequence title	football
Resolution	1920×1080
Number of frames	599
Color space	YV12
Frames per second	30
Source	https://media.withyoutube.com/
Source resolution	FullHD
Bitrate	745.25

People are playing football. YouTube UGC id: Sports_1080P-15d1

Figure 18: football sequence, frame 154

A.19. forest_dog

Sequence title	forest_dog
Resolution	1920×1080
Number of frames	976
Color space	YV12
Frames per second	25
Source	https://vimeo.com/147443541#t=119
Source resolution	FullHD
Bitrate	200.53

Macro shot of flora. Black dog running.

Figure 19: forest_dog sequence, frame 76

A.20. forest_eye

Sequence title	forest_eye
Resolution	1920×1080
Number of frames	1800
Color space	YV12
Frames per second	25
Source	https://vimeo.com/270949005#t=0
Source resolution	FullHD
Bitrate	109.91

Translucent combination of macro shot of eye and moving trees.

Figure 20: forest_eye sequence, frame 229

A.21. getawards

Sequence title	getawards
Resolution	1920×1080
Number of frames	1020
Color space	YV12
Frames per second	25
Source	https://vimeo.com/109953855#t=37
Source resolution	FullHD
Bitrate	170.7

Awards ceremony scene with various lighting effects.

Figure 21: getawards sequence, frame 256

A.22. hard_rock

Sequence title	hard_rock
Resolution	1920×1080
Number of frames	500
Color space	YV12
Frames per second	25
Source	https://media.withyoutube.com/
Source resolution	FullHD
Bitrate	622.08

Poorly lit very noisy scene of people. YouTube UGC id: Musicvideo_1080P-6260

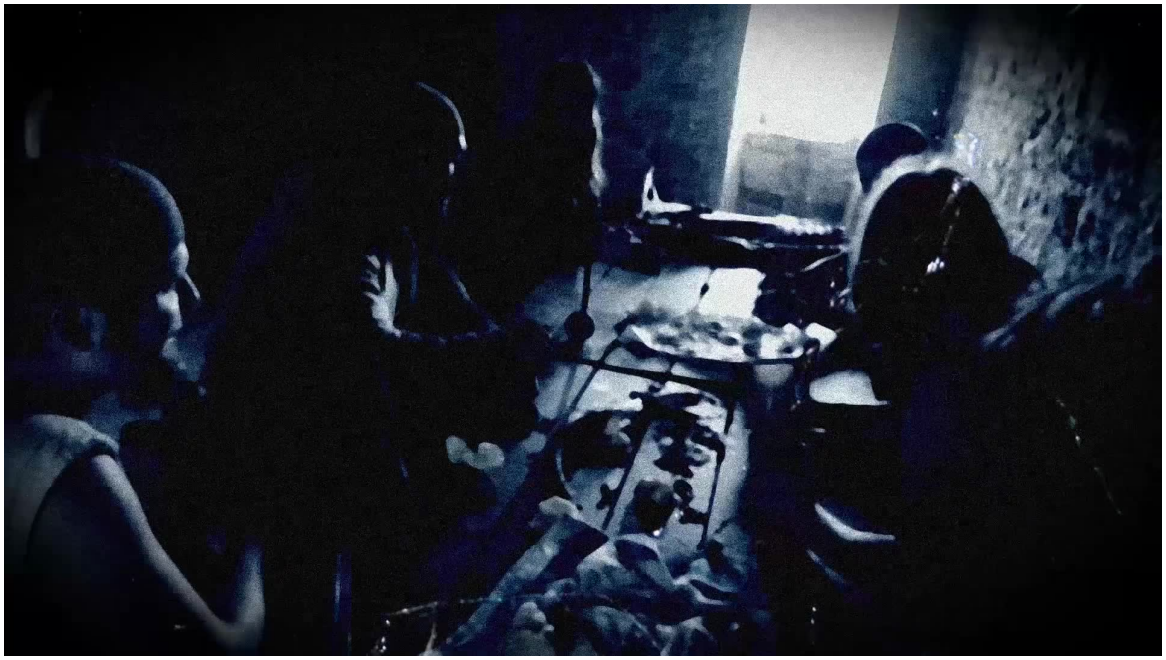

Figure 22: hard_rock sequence, frame 196

A.23. hockey

Sequence title	hockey
Resolution	1920×1080
Number of frames	1000
Color space	YV12
Frames per second	25
Source	
Source resolution	FullHD
Bitrate	622.08

Hockey match shooting.

Figure 23: hockey sequence, frame 591

A.24. humanitarian_day

Sequence title	humanitarian_day
Resolution	1920×1080
Number of frames	1714
Color space	YV12
Frames per second	24
Source	https://vimeo.com/230269965#t=40
Source resolution	FullHD
Bitrate	100.73

A man is talking in front of camera and then presentation slides are shown.

Figure 24: humanitarian_day sequence, frame 1031

A.25. inner_shaq

Sequence title	inner_shaq
Resolution	1920×1080
Number of frames	1569
Color space	YV12
Frames per second	24
Source	https://vimeo.com/98938526#t=41
Source resolution	FullHD
Bitrate	56.06

Animation and shooting of man reading book.

Figure 25: inner_shaq sequence, frame 411

A.26. kentucky_orchestra

Sequence title	kentucky_orchestra
Resolution	1920×1080
Number of frames	1107
Color space	YV12
Frames per second	30
Source	https://vimeo.com/240521451#t=30
Source resolution	FullHD
Bitrate	214.39

Open air concert shooting of scene and spectators.

Figure 26: kentucky_orchestra sequence, frame 917

A.27. kindergarten_interview

Sequence title	kindergarten_interview
Resolution	1920×1080
Number of frames	1016
Color space	YV12
Frames per second	30
Source	https://vimeo.com/240545712#t=199
Source resolution	FullHD
Bitrate	206.36

One man is interviewing other.

Figure 27: kindergarten_interview sequence, frame 352

A.28. kings_park

Sequence title	kings_park
Resolution	1920×1080
Number of frames	1618
Color space	YV12
Frames per second	24
Source	https://vimeo.com/206436795#t=82
Source resolution	FullHD
Bitrate	109.46

Information video with people speaking in front of camera and old fashioned scenes.

Figure 28: kings_park sequence, frame 801

A.29. mountain_valley

Sequence title	mountain_valley
Resolution	1920×1080
Number of frames	266
Color space	YV12
Frames per second	24
Source	https://vimeo.com/152043736#t=0
Source resolution	FullHD
Bitrate	117.44

Static shot of mountain valley.

Figure 29: mountain_valley sequence, frame 66

A.30. music_band

Sequence title	music_band
Resolution	1920×1080
Number of frames	1325
Color space	YV12
Frames per second	30
Source	https://vimeo.com/295055108#t=528
Source resolution	FullHD
Bitrate	153.61

Static video of a concert with lighting changing color.

Figure 30: music_band sequence, frame 997

A.31. okeechobee

Sequence title	okeechobee
Resolution	1920×1080
Number of frames	1402
Color space	YV12
Frames per second	24
Source	https://vimeo.com/207154158#t=0
Source resolution	FullHD
Bitrate	97.85

Concert record shot from different points.

Figure 31: okeechobee sequence, frame 1250

A.32. park_mobile

Sequence title	park_mobile
Resolution	1920×1080
Number of frames	359
Color space	YV12
Frames per second	24
Source	https://vimeo.com/276123825#t=0
Source resolution	FullHD
Bitrate	112.69

Commercial of paying system.

Figure 32: park_mobile sequence, frame 18

A.33. pyranha_kayak

Sequence title	pyranha_kayak
Resolution	1920×1080
Number of frames	235
Color space	YV12
Frames per second	24
Source	https://vimeo.com/218791374#t=0
Source resolution	FullHD
Bitrate	110.01

A man is talking in front of camera.

Figure 33: pyranha_kayak sequence, frame 126

A.34. pyranha_rafting

Sequence title	pyranha_rafting
Resolution	1920×1080
Number of frames	1203
Color space	YV12
Frames per second	24
Source	https://vimeo.com/218791521#t=0
Source resolution	FullHD
Bitrate	102.76

Panning shots of whitewater rafting.

Figure 34: pyranha_rafting sequence, frame 857

A.35. restaurant_talk

Sequence title	restaurant_talk
Resolution	1920×1080
Number of frames	1047
Color space	YV12
Frames per second	24
Source	https://vimeo.com/153438735#t=40
Source resolution	FullHD
Bitrate	122.24

A man and a women are sitting in a restaurant and making order.

Figure 35: restaurant_talk sequence, frame 11

A.36. road_timelapse

Sequence title	road_timelapse
Resolution	1920×1080
Number of frames	759
Color space	YV12
Frames per second	30
Source	https://vimeo.com/204297495#t=140
Source resolution	FullHD
Bitrate	130.75

Sped up footage from a dash cam. Objects reflecting in the windshield.

Figure 36: road_timelapse sequence, frame 644

A.37. saltburn

Sequence title	saltburn
Resolution	1920×1080
Number of frames	1103
Color space	YV12
Frames per second	30
Source	https://vimeo.com/237783771#t=0
Source resolution	FullHD
Bitrate	231.43

Aerial shots of people surfing and car riding on the beach.

Figure 37: saltburn sequence, frame 297

A.38. strange_morning

Sequence title	strange_morning
Resolution	1920×1080
Number of frames	790
Color space	YV12
Frames per second	24
Source	https://vimeo.com/247377555#t=0
Source resolution	FullHD
Bitrate	352.32

Man wakes up and walks around the house.

Figure 38: strange_morning sequence, frame 534

A.39. street_musician

Sequence title	street_musician
Resolution	1920×1080
Number of frames	974
Color space	YV12
Frames per second	24
Source	https://vimeo.com/278962682#t=209
Source resolution	FullHD
Bitrate	173.1

Handheld video of a musician performing and people listening. Heavy grain and black and white sections.

Figure 39: street_musician sequence, frame 814

A.40. summer_of_adventure

Sequence title	summer_of_adventure
Resolution	1920×1080
Number of frames	994
Color space	YV12
Frames per second	30
Source	https://vimeo.com/263072697#t=0
Source resolution	FullHD
Bitrate	131.23

Summer camp commercial, consists of nature scenes, POV shots and a slideshow.

Figure 40: summer_of_adventure sequence, frame 943

A.41. surfing

Sequence title	surfing
Resolution	1920×1080
Number of frames	120
Color space	YV12
Frames per second	30
Source	https://vimeo.com/229222744#t=0
Source resolution	FullHD
Bitrate	93.95

Shaky footage of a man surfing. Lots of water droplets in the frame.

Figure 41: surfing sequence, frame 59

A.42. suriname_reserve

Sequence title	suriname_reserve
Resolution	1920×1080
Number of frames	992
Color space	YV12
Frames per second	24
Source	https://vimeo.com/129480397#t=0
Source resolution	FullHD
Bitrate	111.87

An infomercial with CGI content followed by static shots of nature.

Figure 42: suriname_reserve sequence, frame 896

A.43. tennis_vlog

Sequence title	tennis_vlog
Resolution	1440×1080
Number of frames	599
Color space	YV12
Frames per second	30
Source	https://media.withyoutube.com/
Source resolution	FullHD
Bitrate	558.94

Selfie video followed by a girl practicing hitting a baseball. YouTube UGC id: Vlog_1080P-19cc

Figure 43: tennis_vlog sequence, frame 476

A.44. teton_bros

Sequence title	teton_bros
Resolution	1920×1080
Number of frames	1003
Color space	YV12
Frames per second	24
Source	https://vimeo.com/193843331#t=125
Source resolution	FullHD
Bitrate	109.95

Sportswear commercial with static indoors shots and smooth skiing scenes.

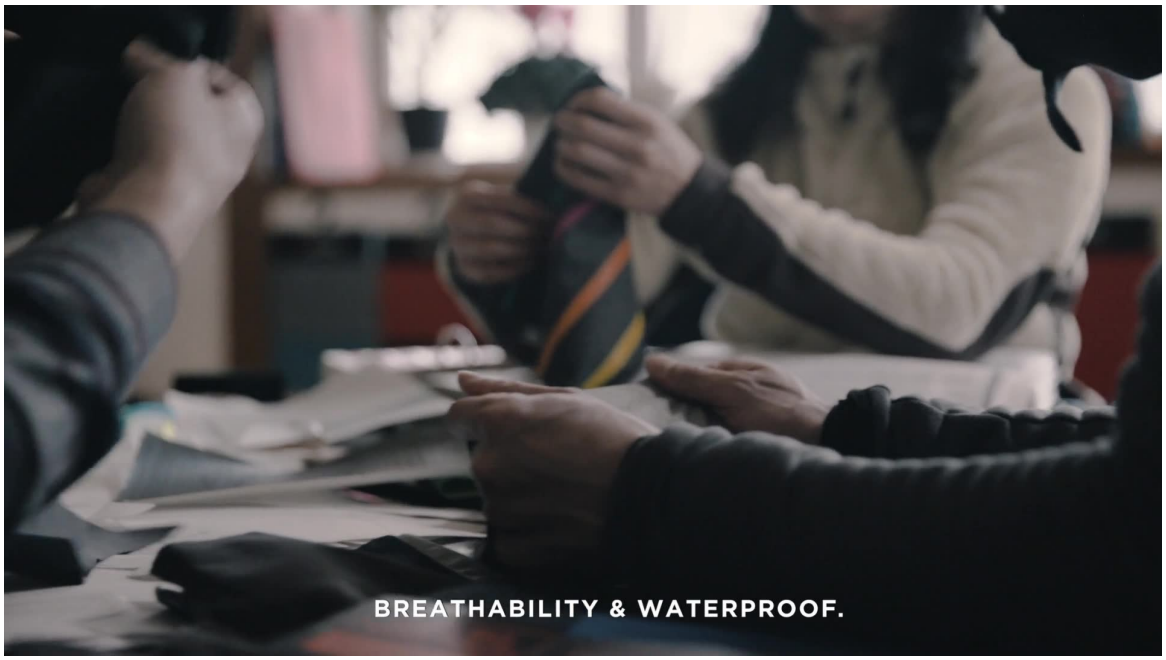

Figure 44: teton_bros sequence, frame 198

A.45. the_refuge

Sequence title	the_refuge
Resolution	1920×1080
Number of frames	1001
Color space	YV12
Frames per second	24
Source	https://vimeo.com/189686202#t=0
Source resolution	FullHD
Bitrate	146.97

Film beginning. A lot of shots against the sun.

Figure 45: the_refuge sequence, frame 978

A.46. underwater_shooting

Sequence title	underwater_shooting
Resolution	1920×1080
Number of frames	1170
Color space	YV12
Frames per second	24
Source	https://vimeo.com/155272894#t=43
Source resolution	FullHD
Bitrate	20.85

Macro shots of underwater flora with sand particles floating about. Video has grain.

Figure 46: underwater_shooting sequence, frame 601

A.47. video_lecture

Sequence title	video_lecture
Resolution	1920×1080
Number of frames	600
Color space	YV12
Frames per second	30
Source	https://media.withyoutube.com/
Source resolution	FullHD
Bitrate	746.5

Screen capture of a presentation. YouTube UGC id: Lecture_1080P-0201

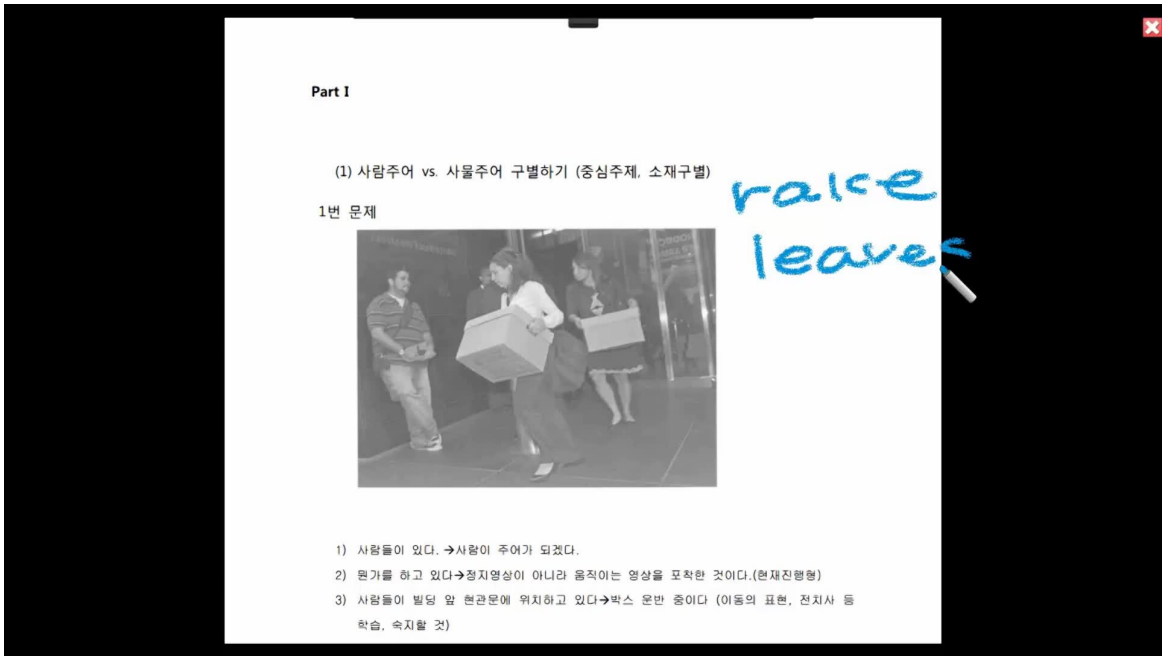

Figure 47: video_lecture sequence, frame 277

A.48. way_out

Sequence title	way_out
Resolution	1920×1080
Number of frames	931
Color space	YV12
Frames per second	25
Source	https://vimeo.com/299069542#t=158
Source resolution	FullHD
Bitrate	174.61

Static shots of people in an office and in nature. Video has subtitles and credits at the end.

Figure 48: way_out sequence, frame 8

A.49. wedding_party

Sequence title	wedding_party
Resolution	1920×1080
Number of frames	1757
Color space	YV12
Frames per second	24
Source	https://vimeo.com/289211810#t=247
Source resolution	FullHD
Bitrate	196.61

Bride and groom dancing. Colorful illumination with flashes of light.

Figure 49: wedding_party sequence, frame 1133

A.50. wedding_preparations

Sequence title	wedding_preparations
Resolution	1920×1080
Number of frames	992
Color space	YV12
Frames per second	24
Source	https://vimeo.com/304724631#t=0
Source resolution	FullHD
Bitrate	175.18

Clip starts off with a drone shot, then shows close up shots of bride applying makeup and groom getting dressed.

Figure 50: wedding_preparations sequence, frame 804

B. VIDEO SELECTION

In “MSU Video Codecs Comparison 2016” we introduced a technique for selecting test video sequences. This technique allows for creating a set containing representative sequences. For this report, we used the same method and updated the video database from which we sample videos.

Figure 51 shows the bit rate distributions for our video data set by years. Table Table 1 shows the number of videos in our video collection.

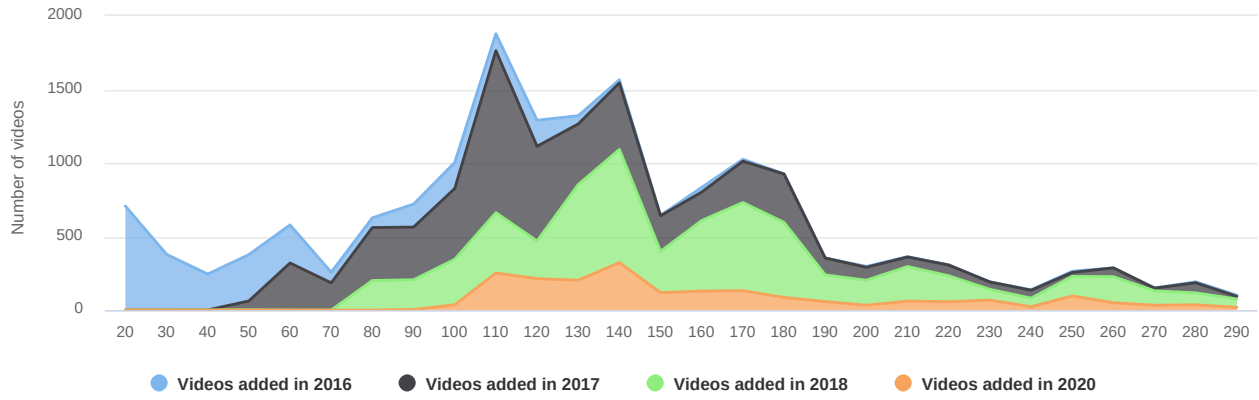

Figure 51: Bit rate distributions for comparison video set.

Year	FullHD videos	FullHD samples	4K videos	4K samples	Total (videos)	**Total (samples)**
2016	3	7	882	2902	885	2909
2017	1996	4638	1544	4561	3540	9299
2018	4342	10330	1946	5503	6288	15833
2020	4945	12402	2091	6016	7036	**18418**

Table 1: Number of videos in MSU video collection.

We resized and cropped 4K videos to FullHD resolution in order to avoid compression artifacts, and at scene changes, we cut all videos to samples using an approximate length of 1,000 frames.

To evaluate spatial and temporal complexity, we encoded all samples using x264 with a constant quantization parameter (QP). We calculated the temporal and spatial complexity for each scene, defining spatial complexity as the average size of the I-frame normalized to the sample’s uncompressed frame size. Temporal complexity in our definition is the average size of the P-frame divided by the average size of I-frame. [1] Also, an additional preprocessing step was added to unify chroma subsampling of videos which affects evaluating complexity. All videos were converted to YUV 4:2:0 chroma subsample. Distribution of obtained samples compared to samples from previous codec comparisons is shown in Figure 52.

[1] C. Chen et. al., “A Subjective Study for the Design of Multi-resolution ABR Video Streams with the VP9 Codec,” 2016.

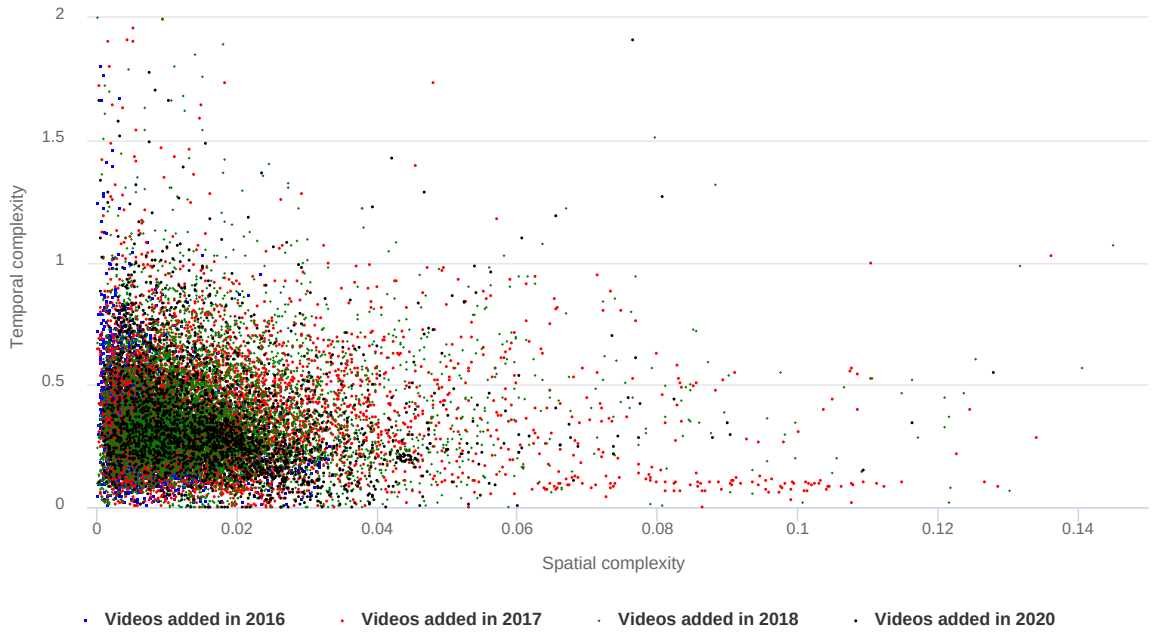

Figure 52: Distribution of obtained samples.

This year, we conducted a voting to choose final set of 50 videos for the comparison. Participation in video selection was optional. We divided the video collection into 50 clusters. For each cluster, we randomly selected from 2 to 6 candidate videos that were close to the cluster centre and that had a license enabling derivatives and commercial use. Figure 53 shows the cluster boundaries and constituent sequences.

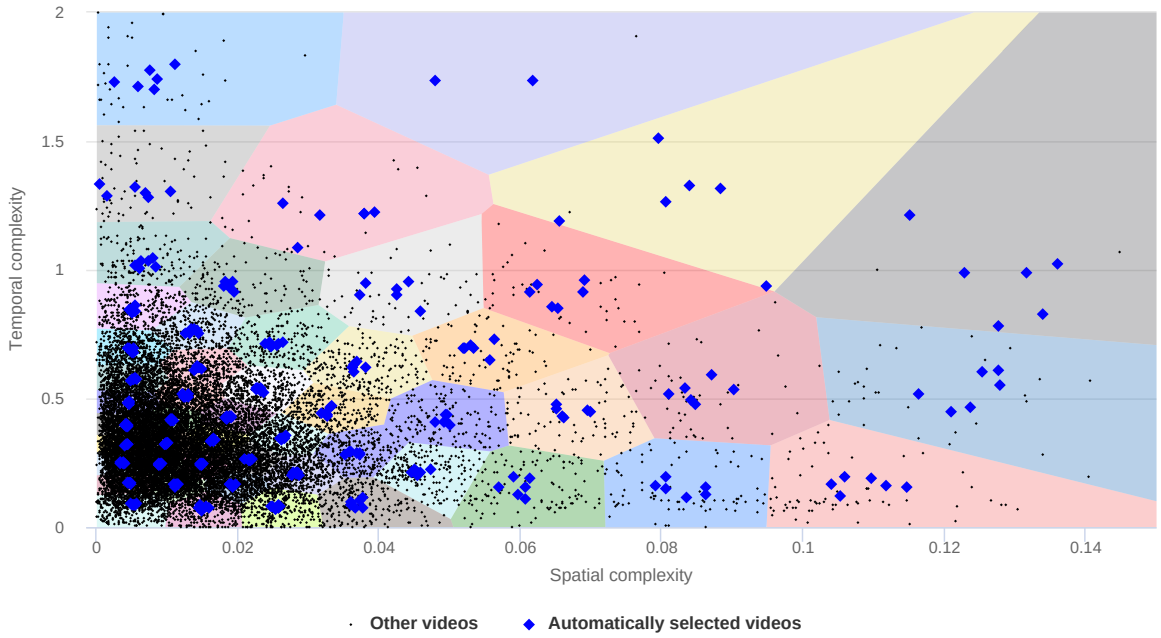

Figure 53: Segmentation of samples.

All comparison participants were invited to participate in video selection, and seven took part in it. Also, four

members of codecs comparison group (Dr Dmitriy Kulikov, Anastasia Antsiferova, Egor Sklyarov and Nickolay Safonov) and independent industry expert (Jan Ozer https://streaminglearningcenter.com/about-jan-ozer) took part in voting for final video set. Table 2 contains information about video selection participants.

Voter	Number of clusters to vote	Number of received votes
Dr D. Kulikov	50	50
J. Ozer	50	50
Egor Sklyarov	50	50
Anastasia Antsiferova	30	29
Nickolay Safonov	30	28
Participant #0	15	15
Participant #1	15	15
Participant #2	15	15
Participant #3	15	12
Participant #4	15	15
Participant #5	15	15
Participant #6	15	15
Participant #7	15	15

Table 2: Voted members of video selection.

For every participant, only a subset of clusters is available for voting. Each participant was suggested to choose one video in each of 15 given clusters. These clusters were chosen randomly, overlapped for different voters and equally covered all 50 clusters. A participant was able to change a vote until the end of voting. Fig. 54 shows the interface of video selection platform.

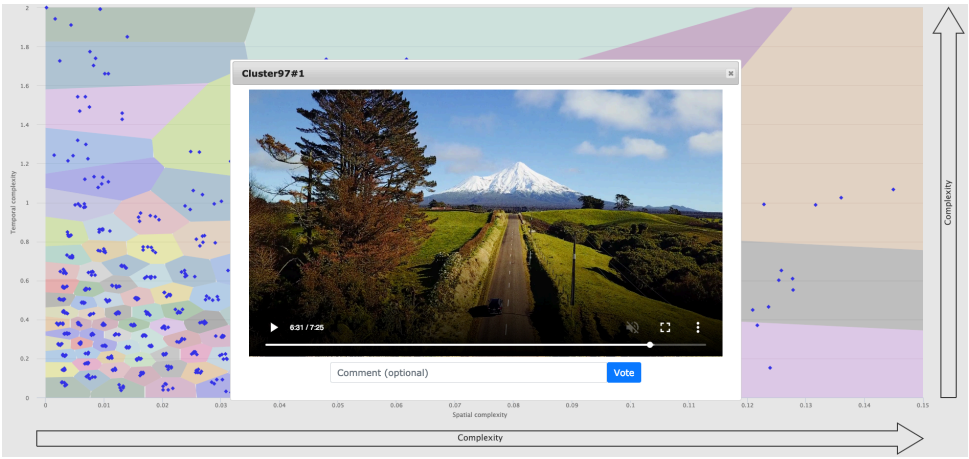

Figure 54: Video selection platform interface.

At the end of voting, videos with the highest number of votes were selected for the final comparison set. List of final videos and votes for them is presented in separate PDF with videos descriptions, and their distribution in SI/TI space among all videos from collection is shown in Fig. 55.

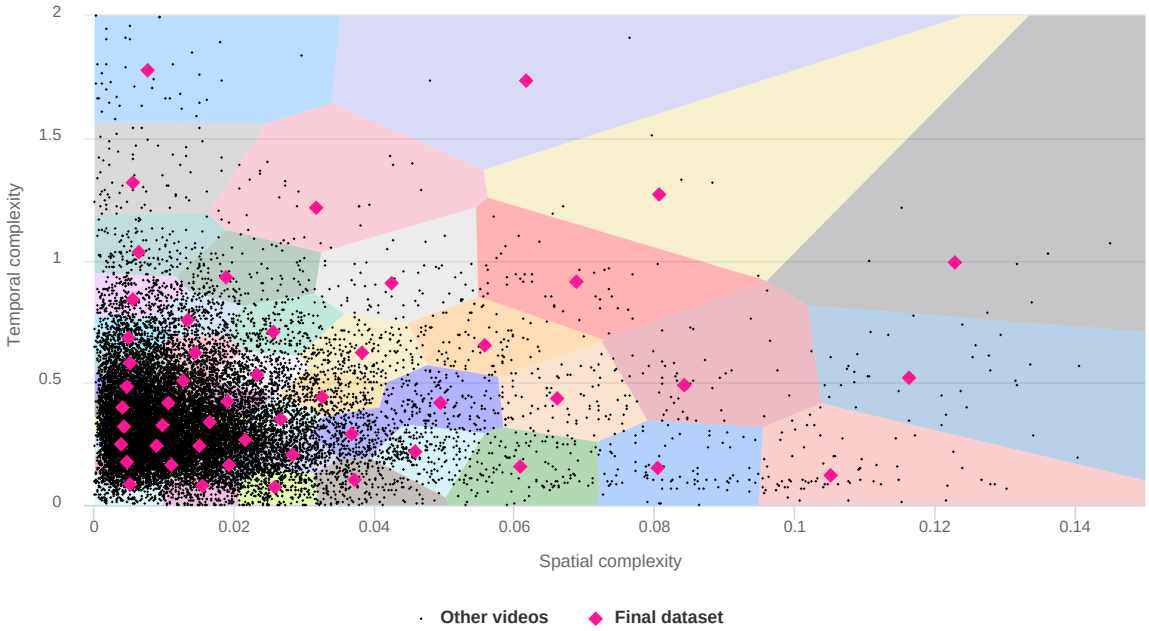

Figure 55: Distribution of sequences in final set.

The new data set consists of 50 sequences, the complete list of sequences appears in Appendix A.

C. ABOUT THE GRAPHICS & MEDIA LAB VIDEO GROUP

The Graphics & Media Lab Video Group is part of the Computer Science Department of Lomonosov Moscow State University. The Graphics Group began at the end of 1980's, and the Graphics & Media Lab was officially founded in 1998. The main research avenues of the lab include areas of computer graphics, computer vision and media processing (audio, image and video). A number of patents have been acquired based on the lab's research, and other results have been presented in various publications.

The main research avenues of the Graphics & Media Lab Video Group are video processing (pre- and post-, as well as video analysis filters) and video compression (codec testing and tuning, quality metric research and codec development).

The main achievements of the Video Group in the area of video processing include:

- High-quality industrial filters for format conversion, including high-quality deinterlacing, high-quality frame rate conversion, new, fast practical super resolution and other processing tools.
- Methods for modern television sets, such as a large family of up-sampling methods, smart brightness and contrast control, smart sharpening and more.
- Artifact removal methods, including a family of denoising methods, flicking removal, video stabilization with frame edge restoration, and scratch, spot and drop-out removal.
- Application-specific methods such as subtitle removal, construction of panorama images from video, video to high-quality photo conversion, video watermarking, video segmentation and practical fast video deblur.

The main achievements of the Video Group in the area of video compression include:

- Well-known public comparisons of JPEG, JPEG-2000 and MPEG-2 decoders, as well as MPEG-4 and annual H.264 codec testing; codec testing for weak and strong points, along with bug reports and codec tuning recommendations.
- Video quality metric research; the MSU Video Quality Measurement Tool and MSU Perceptual Video Quality Tool are publicly available.
- Internal research and contracts for modern video compression and publication of MSU Lossless Video Codec and MSU Screen Capture Video Codec; these codecs have one of the highest available compression ratios.

The Video Group has also worked for many years with companies like Intel, Samsung and RealNetworks.

In addition, the Video Group is continually seeking collaboration with other companies in the areas of video processing and video compression.

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D. SEQUENCES VOITING RESULTS

Sequence	D. Kulikov	J. Ozer	P0	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
ac_origins	+	+		-	-	-				+			
aerial_media		+				-	-	-		+		-	
alt_rock	+	-	-	-	-	+							
apple_tree		+	-		-	+			-	-	+	-	
ariadnes_thread		+	+		-	+				-			
baseball_vlog		-	-	+		+		-			+		
beach_interview		+		+		+		-		-	+		
bhutan	+	-				+				+			
bsu_volleyball	-	-	+			+	+	-		-			
chili_pepper	+	-			-	+		-					
christmas_cats	+	-		-	-	-				+		+	
cineei_mode	+	-	-		-	-	-	+		+	+		
construction_site		+			+	+				+			
creek_cooler	+	-	-	+		-			-	+		+	+
crowd_run		+			+	-		-					
dusk_train		-	+		+	-		+		-			+
fishing		-	+			+			+			-	
flower_shop	+	+			+	-		+		-			
football		+			-	+	+	+		+			
forest_dog	+	-				+	-			+	-		-
forest_eye		-			+	+		+		-			
getawards	+	+			-	-	-						
hard_rock	+	+	-		-	-	-			+	-		
hockey	-	-	+		+	+				-		-	
humanitarian_day		+		-	+	+			-				
inner_shaq	+	-				+	-		+	+			
kentucky_orchestra		-				+			+	-	+		
kindergarten_interview		-				+			-	+	-		
kings_park	+	+				-		-		+			

mountain_valley			+				+			-	+		-	+
music_band	+		+		-		-			-	-			
okeechobee	+		+			-	-		+				-	
park_mobile	+		+		-		-							-
pyranha_kayak			+				-			-				+
pyranha_rafting			+		-		+						-	
restaurant_talk			-	-			+			-		+		
road_timelapse			+		-	+	-							-
saltburn			+	-		-	-			+			-	
strange_morning			-			+	-	+				-	-	+
street_musician	+		-		-	-	-				+	+	-	
summer_of_adventure			+				-	-		+				
surfing	+		-		-	+	+				+	-		+
suriname_reserve			+	-	+		-	-					-	
teton_bros	+		-				-				+			+
the_refuge			-			-	+	+						
underwater_shooting			+			+	-					-		+
video_lecture			+			-	-	-		+	-	+	+	
way_out			+				-		-		-		+	-
wedding_party			+			-	+	-	-	+				
wedding_preparations	+		-	-	+	-	-	+				-		

Table 3: List of selected sequences and their votes.