Selective Motion Estimation Strategy Based on Content Classification for HEVC Screen Content Coding

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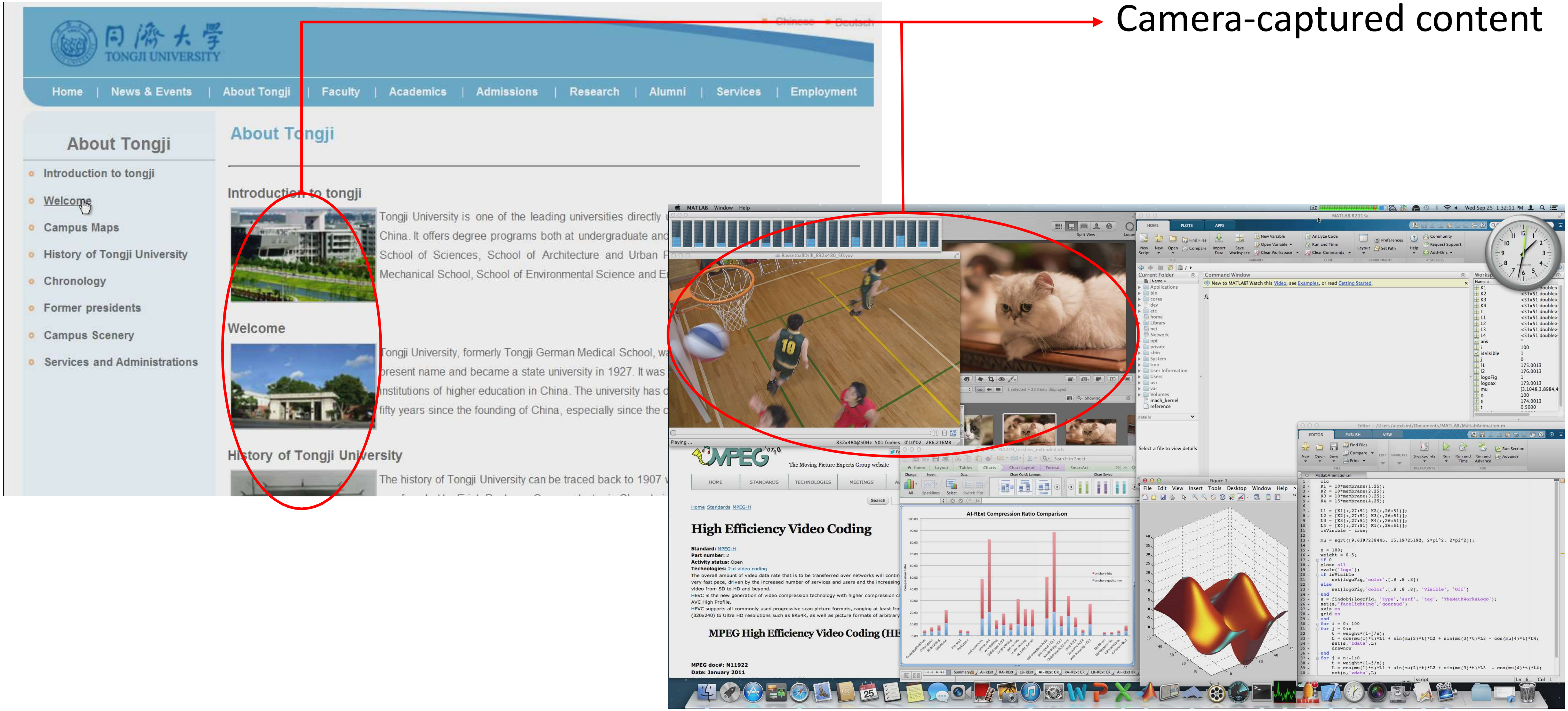
Screen Content Videos



Camera-captured content

TZ Search(TZS) vs. TZ Search Selective(TZSS)

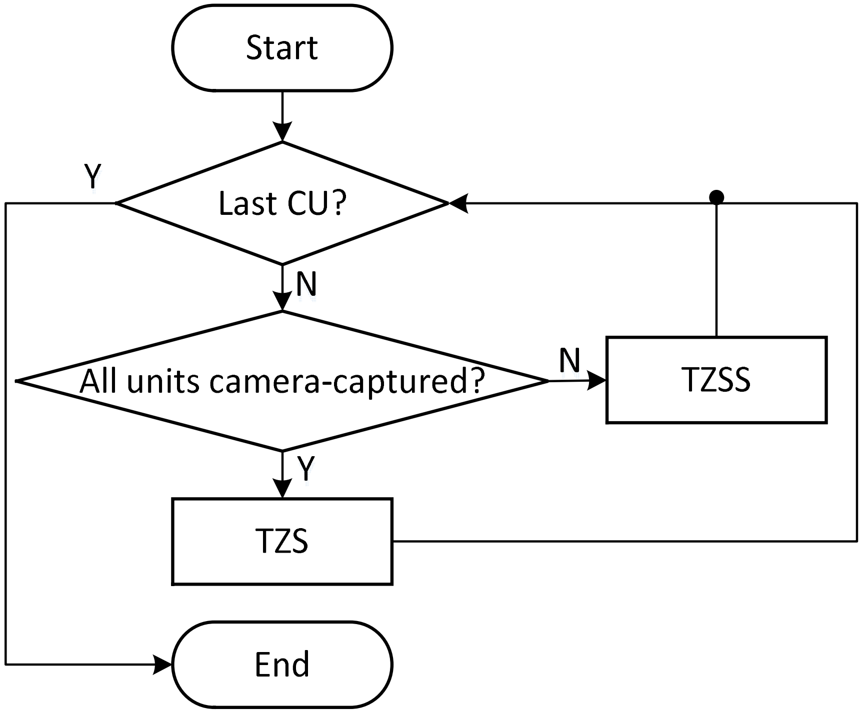
Compared with TZSS：

- TZS consumes less encoding time.
- For camera-captured content, TZS hardly brings any encoding efficiency degradation.

Table 1. TZS Compared with TZSS (32 frames, low delay, various QPs)

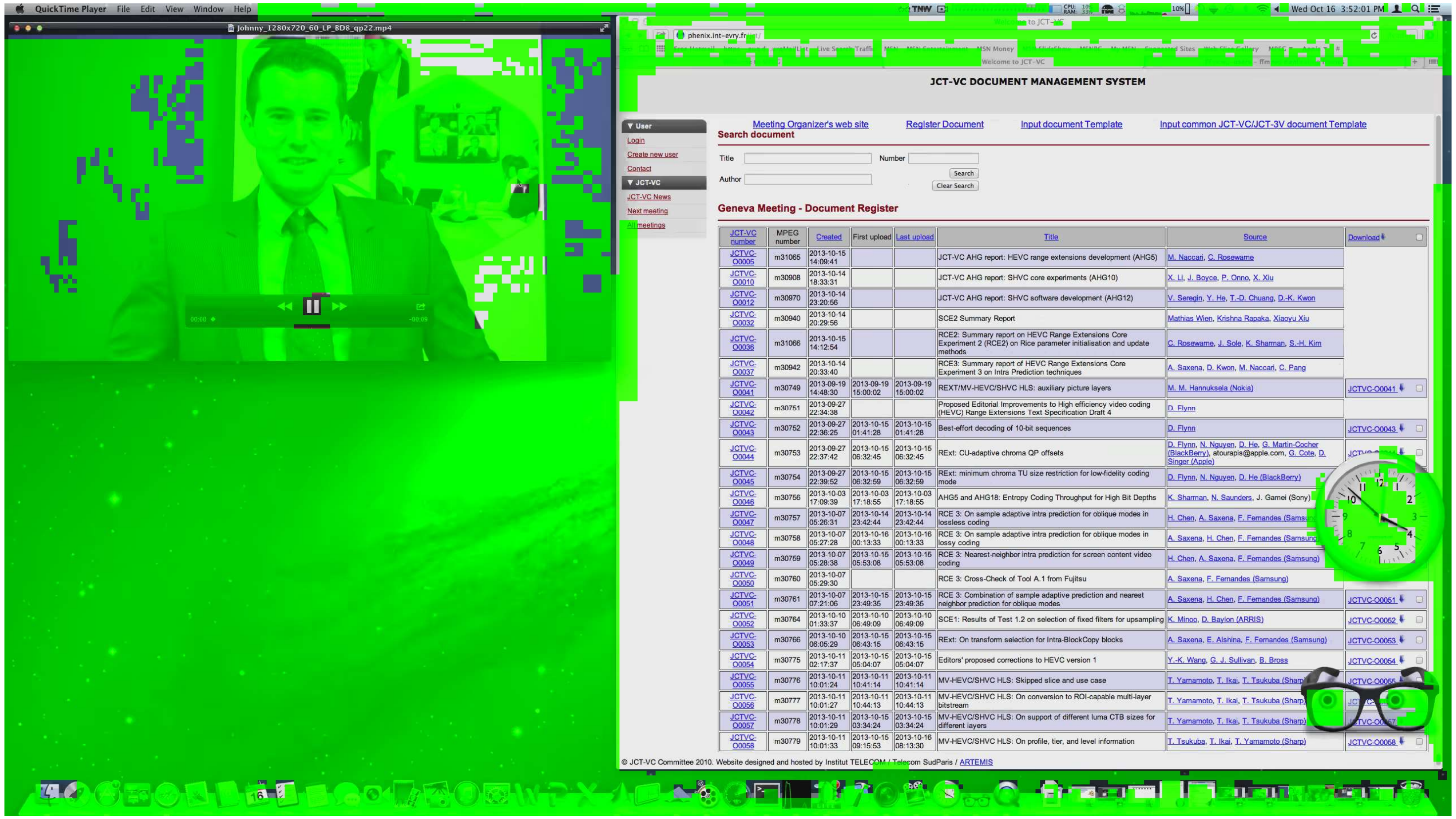
Sequences		Y/G BD-rate (%)		Enc time saving (%)	
		YUV444	**RGB**	**YUV444**	**RGB**
Pure Screen Content	***sc_flyingGraphics***	2.92	2.84	34	30
	sc_desktop	2.45	2.65	22	20
	sc_console	6.44	4.39	30	24
Pure Camera-captured Content	***EBURainFruits***	0.04	-0.01	25	21
	Kimono1	-0.22	0.06	39	30

Selective Motion Estimation Strategy



Since TZS is better than TZSS for camera-captured content, the HM-SCC encoder can speed up by applying an adaptively selective motion estimation strategy. For each screen content inter frame, it is firstly classified into screen content areas and camera-captured areas. Then, the camera-captured CUs (Coding Unit) and the screen content CUs will be adaptively switched between TZS and TZSS motion estimation method.

CU Content Classification



denotes camera-captured areas.

Experimental Results

Table 2. Lowdelay configuration

Sequences	Y/G BD-rate (%)		Encoding Time Saving (%)	
	YUV444	RGB	YUV444	RGB
sc_flyingGraphics	0.01	0.21	0	-1
sc_desktop	0.01	0.01	-1	-1
sc_console	0.00	0.00	-1	0
sc_web_browsing	0.07	0.24	4	4
sc_map	0.51	0.34	31	26
sc_programming	0.28	0.06	15	12
sc_SlideShow	0.61	0.47	21	17
Basketball_Screen	0.23	0.42	28	22
MissionControlClip2	0.21	0.14	17	16
MissionControlClip3	0.27	0.28	13	13
sc_robot	0.43	0.41	32	29
EBURainFruits	0.05	0.03	16	13
Kimono1	0.00	-0.05	39	25
Average	0.20		15	

Table 3. Random Access configuration

Sequences	Y/G BD-rate (%)		Encoding Time Saving (%)	
	YUV444	RGB	YUV444	RGB
sc_flyingGraphics	0.24	0.06	-1	0
sc_desktop	0.00	-0.01	14	11
sc_console	0.00	0.00	3	4
sc_web_browsing	0.00	-0.03	0	-1
sc_map	0.22	0.20	14	10
sc_programming	0.12	0.09	18	17
sc_SlideShow	0.23	0.46	25	23
Basketball_Screen	0.14	0.15	16	17
MissionControlClip2	0.04	0.01	10	10
MissionControlClip3	0.07	0.07	9	9
sc_robot	0.34	0.38	26	21
EBURainFruits	0.02	0.07	14	12
Kimono1	0.08	0.20	32	21
Average	0.12		13	

Thanks!