

JPEG Compression

Hardware and Software requirements

- Operation system Ubuntu
- Hardware Jetson nano 4 core, I7
- GPU Jetson nano internal GPU

Method

- Compression with GPU
 - ~~Fast video SDK~~
 - Easy to use best way but it's not free
 - ~~NVJPEG~~
 - Nvidia jpeg compression but not support arm architecture
 - ~~CNET/GPUJPEG~~
 - C++ lib but abandon and not work on CUDA 10
- Compression with CPU
 - Opencv
 - Little bit slower but smaller file size
 - TurboJpegLib
 - Faster than opencv plus bigger file size
 - ~~Wand(imagemagick API) for python~~
 - Two method upper are better
- Compression with OpenCL(GPU+CPU)
 - ~~Imagemagick~~
 - OpenCL not support for Compression

Benchmark for Jpeg Compression on Jetson nano

JpegTurbo 4k image 24 bit 41MB

Qualilty	Duration(ms)	File Size (KB)	FPS
10	125.31	178.62	7.98
20	123.27	207.79	8.11
30	125.89	238.47	7.94
40	129.53	274.04	7.72
50	129.61	322.01	7.72
60	134.39	390.79	7.44
70	138.03	522.89	7.24
80	146.25	780.09	6.84
90	161.83	1434.2	6.18
100	293.48	7848.49	3.41

Opencv (JpegTurbo built-in) 4k image 24 bit 41MB

Qualilty	Duration(ms)	File Size (KB)	FPS
10	135.5	147.46	7.38
20	133.89	176.56	7.47
30	137.44	205.3	7.28
40	137.67	237.76	7.26
50	140.23	281.08	7.13
60	142.06	340.83	7.04
70	146.36	454.62	6.83
80	151.25	667.45	6.61
90	162.84	1206.22	6.14
100	248.99	5751.87	4.02

JpegTurbo 2k image 24 bit 18MB

Qualilty	Duration(ms)	File Size (KB)	FPS
10	54.55	82.02	18.33
20	55.49	98.61	18.02
30	56.87	114.58	17.58
40	57.54	129.22	17.38
50	58.07	145.5	17.22
60	59.34	167.22	16.85
70	61.25	211.71	16.33
80	64.32	305.22	15.55
90	70.21	569.76	14.24
100	127.77	3339.75	7.83

Opencv (JpegTurbo built-in) 2k image 24 bit 18MB

Qualilty	Duration(ms)	File Size (KB)	FPS
10	59.05	68.28	16.93
20	59.71	84.87	16.75
30	60.66	100.14	16.49
40	61.33	113.91	16.3
50	61.83	128.82	16.17
60	63.1	148.19	15.85
70	64.24	187.62	15.57
80	66.18	266.31	15.11
90	71.2	487.56	14.04
100	109.11	2420.25	9.16

JpegTurbo 1920x1080 image 24 bit 10 MB

Quality	Duration(ms)	File Size (KB)	FPS
10	31.03	47.43	32.23
20	32.27	58.51	30.99
30	32.89	69.01	30.4
40	34.05	78.08	29.37
50	35.28	87.14	28.34
60	34.6	98.11	28.9
70	35.47	119.06	28.19
80	36.72	164.33	27.23
90	39.9	299.97	25.06
100	70.73	1797.98	14.14

Opencv (JpegTurbo built-in) 1920x1080 image 24 bit 10 MB

Quality	Duration(ms)	File Size (KB)	FPS
10	33.12	39.99	30.19
20	33.82	51.01	29.57
30	35.74	61.11	27.98
40	36.24	69.65	27.6
50	36.52	78.03	27.38
60	36.47	87.84	27.42
70	36.21	106.66	27.62
80	37.7	145.41	26.52
90	40.03	260.54	24.98
100	59.95	1306.41	16.68

JpegTurbo 1280x720 image 24 bit 4 MB

Quality	Duration(ms)	File Size (KB)	FPS
10	14.13	22.22	70.78
20	14.56	28.3	68.68
30	14.79	33.83	67.63
40	15.04	38.6	66.47
50	14.99	43.37	66.7
60	15.2	48.68	65.81
70	15.54	57.57	64.36
80	16.08	75.05	62.19
90	17.53	127.88	57.03
100	31.12	746.38	32.13

Opencv (JpegTurbo built-in) 1280x720 image 24 bit 4 MB

Quality	Duration(ms)	File Size (KB)	FPS
10	15.02	18.82	66.58
20	15.37	24.78	65.06
30	15.52	30.06	64.45
40	15.72	34.56	63.62
50	15.55	38.97	64.3
60	16.05	43.73	62.31
70	16.01	51.75	62.48
80	18.78	66.94	53.25
90	17.55	112.97	56.99
100	26.49	546.52	37.75

JpegTurbo 640x480 image 24 bit 1 MB

Quality	Duration(ms)	File Size (KB)	FPS
10	5.23	8.59	191.35
20	5.38	11.22	185.91
30	5.56	13.59	179.84
40	5.58	15.64	179.34
50	5.65	17.69	176.94
60	5.76	19.91	173.73
70	5.81	23.46	172.24
80	5.97	29.61	167.4
90	6.65	46.2	150.42
100	10.52	230.71	95.05

Opencv (JpegTurbo built-in) 640x480 image 24 bit 1 MB

Quality	Duration(ms)	File Size (KB)	FPS
10	5.34	7.38	187.32
20	5.37	9.84	186.25
30	5.53	12.09	180.94
40	5.55	13.97	180.21
50	5.62	15.86	177.95
60	5.98	17.85	167.09
70	5.97	21.08	167.38
80	5.9	26.56	169.46
90	6.17	41.11	162.19
100	8.66	173.39	115.51

Test image

