

ELEC-H-473 — Exercise 03

Multi-threaded execution (on a multi-core architecture)

We have compared the SIMD implementations of the grayscale to binary image in single threaded mode, with two threads, four threads and eight threads. We have also done the same thing with the Max filter algorithm.

We can see a trend in our results: using multithreading does not improve the running time of our algorithm. This is probably due to memory bottlenecks. However, using 4 threads instead of two divides the running time by two in the case of the grayscale to binary conversion. In the case of the Max filter however, adding more threads increases the running time consistently. This means that the performance gain by parallelizing the program does not offset the context switches introduced with parallelization.

Run #/# of threads	Threshold using SSE instructions (SIMD)				Max Filter using SSE instructions (SIMD)			
	1	2	4	8	1	2	4	8
1	115	948	293	510	162	276	292	170
2	115	929	353	422	164	270	289	558
3	116	978	305	500	164	272	307	175
4	140	1040	296	164	165	283	309	534
5	124	917	296	467	163	296	298	497
6	119	951	299	525	165	289	318	176
7	117	955	326	140	164	285	317	499
8	117	961	296	161	163	283	316	177
9	114	929	301	148	168	274	309	504
10	117	951	292	460	163	282	310	471
Average (µs)	119.4	955.9	305.7	349.7	164.1	281	306.5	376.1

