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ECEC 622

Gaussian Blur Filter

Introduction:

The Gaussian Blur Filter problem is highly parallelizable and easily scales to leverage the large number of cores on the GPU. Each individual average filter operation is given to a thread to compute. Each thread is housed within a 2-D square thread block which is then stored in a 2-D execution grid that maps to the image size. The size of the thread block is a tunable parameter that with be explored in the Results section.

Results:

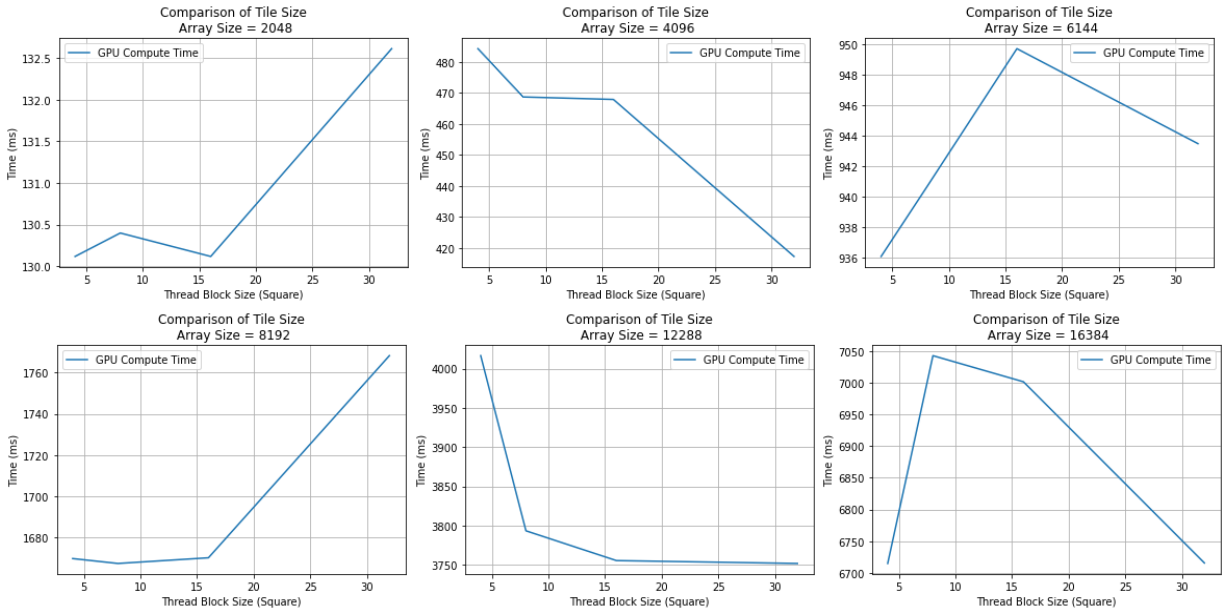

Figure 1: GPU Compute performance among different array sizes and thread block size

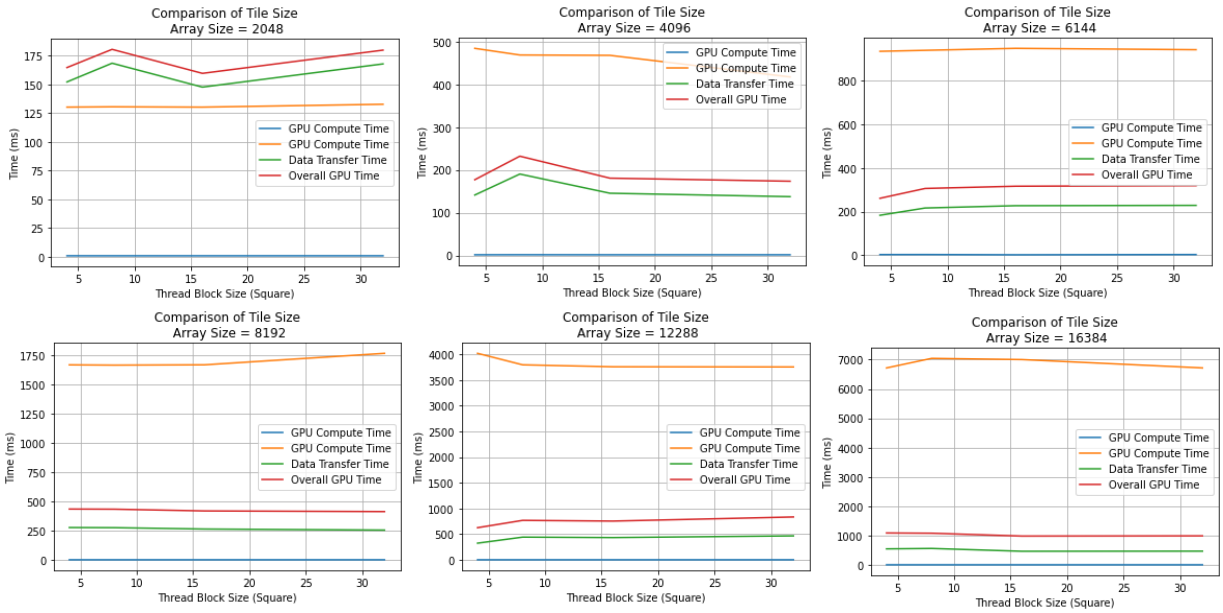

Figure 2: CPU, GPU compute, Data transfer time, and overall GPU time based on different Array sizes and Tile sizes

Conclusion:

Based off the result the optimal thread block size is between 16-32. The variance between performance is most likely because xunil is a shared machine so it is competing with the scheduling of other threads. Besides that, there is a dramatic performance increase from CPU computation to GPU performance.