Homework 13 – OpenACC Kmeans

Jarod Klion

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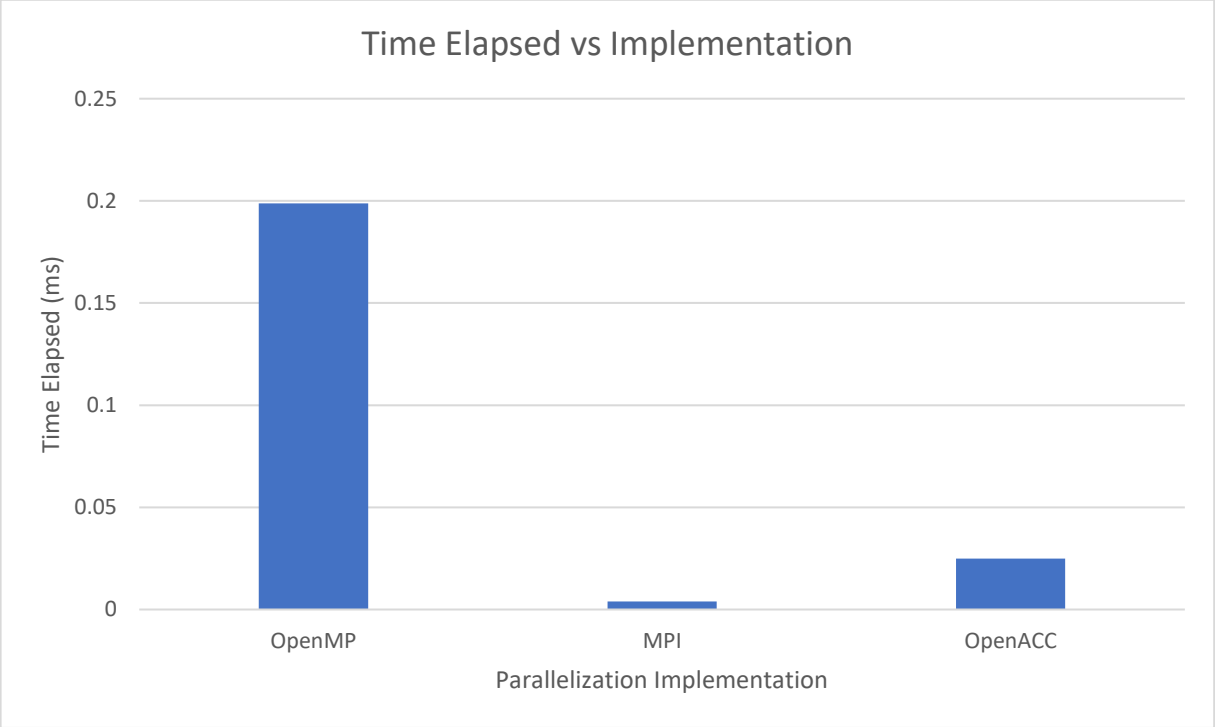
1. Object of the project:
    a. Use OpenACC to redo the previous projects of image segmentation using the k-means algorithm.
2. Details:
    a. Use OpenACC pragmas, similarly to OpenMP, to augment pre-existing code in order to segment an image using the k-means algorithm. This was achieved by wrapping the main loop in a *parallel loop* pragma for parallelization.
3. Results:
    a. Implementation: [OpenMP, MPI, OpenACC]
    b. Time Elapsed (ms): [0.1988, 0.00395, 0.0249]



4. Performance Improvements:
    a. When I had the verbose output for pgc++, it did list that my loop carried scalar dependence for minDist and there was “accelerator restriction: induction variable live-out form loop: minCluster”
5. Bugs Encountered
    a. Initially, my program would fail to compile unless I designated -ta=tesla:managed throwing a “Compiler failed to translate accelerator region: could not find allocated-variable index for symbol – allClusterSum”. Additionally, even after loading the cuda module in my environment, nvprof kept failing to find it so profiling