

February 22nd Milestone Report

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Major Changes:

There are not any major changes since the last meeting. This report follows from the major changes made last time where the direction of the project changed to optimizing the current architecture and algorithm.

What You Have Accomplished Since Your Last Meeting:

I looked at the structure of the codebase and the type of computation being done, data accesses, etc. There isn't too much data parallelism, so using a GPU will not be useful. In addition, CPU-based data parallelism constructs like SIMD will not be that useful. The best option for optimizing the pipeline is through multithreading. The machine supports up to 32 threads, so there is large potential for multithreading. I looked at potential parallel frameworks:

- Pthreads: standard C++ threading library. Using the most bare interface will greatly increase code complexity and leaves the implementation of basic parallel constructs to the user. This is too heavyweight to use.
- ISPC: this has both data parallelism and threading (tasks) support, but is geared more towards data parallelism.
- OpenMP: support for parallel constructs, atomics, synchronization, and scheduling policies. This seems like the best choice.

I also spent some time working on the seed selection algorithm. There are few ideas I would like to try out and determine their effectiveness.

Meeting Your Milestone:

I have met my milestone for these two weeks.

Surprises:

No particular surprises yet.

Looking Ahead:

The next steps are to start analyzing different stages of the seed selection pipeline, and begin thinking and implementing multithreading solutions. Some parts may involve simply adding a parallel directive to a for loop, and other parts may introduce significant rework.

Revisions to Your Future Milestones:

No current revisions are needed. The schedule is continuing as planned in the revised milestones.

Resources Needed:

All resources are available as of now.