618 Milestone

Over the past few weeks, we have made progress toward achieving our project goals. We have successfully completed the sequential version of the Grey Wolf Optimizer algorithm in C++ and are working simultaneously on the parallel version of the algorithm using OpenMP and MPI.

One issue that concerns us is whether it is a good idea to do Support Vector Machines (SVM) in C++, and more generally, the design of the fitness function to evaluate whether a solution is good. Currently, in the sequential version of our algorithm, SVM is simulated by a timeout. We are still determining if it is proper to continue simulating SVM in parallel implementation, as it may not be an accurate representation of the algorithm's performance. However, whether it is worthwhile to actually port SVM to C++ is questionable, as neither GWO nor parallelization will improve the performance of SVM, so it will seem off the topic.

Another issue concerns the number of "wolves" to simulate. Current implementations only consider the three best "wolves" as alpha, beta, and delta, or solutions, but we think that it would be interesting to explore whether more solutions can be included. It will be more suitable for the parallel setting we are in, and it has the potential to utilize more computational power to get a potentially better solution. This is also the case where we can tune the total number of wolves to do experiments.

We believe we will be able to produce the deliverables scheduled to be achieved. There might not be time for the "nice to haves", but if time allows we still consider writing a Python version in Spark in comparison. For the poster session, we will not aim for offering an interactive demo anymore, but we consider visualizing the progress of the GWO in animation to give the users a better idea of the work. The demonstration will use pre-configured data and optimization goals.

Moving forward, we have developed a revised plan of work for the next 2.5 weeks.

April 20-27:

- Finish the implementation of the OpenMP version. (Tong Jin)

- Finish the implementation of the MPI version. (Yiding Chang)

April 28-May 1: Analyzing the difference between the OpenMP, the MPI, and the sequential version. (Tong Jin and Yiding Chang)

May 2-5: Write the final report and prepare for the demo. (Tong Jin and Yiding Chang)