CS 533
Homework 2 Report

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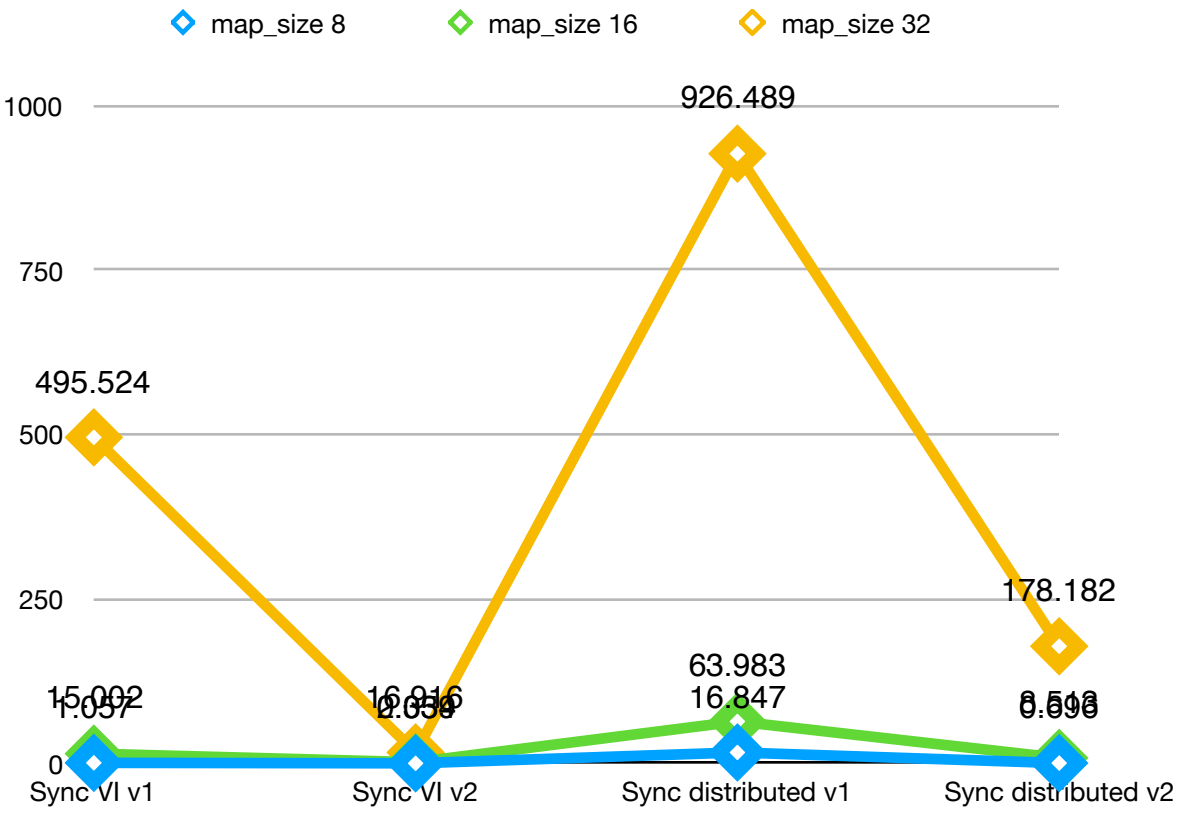
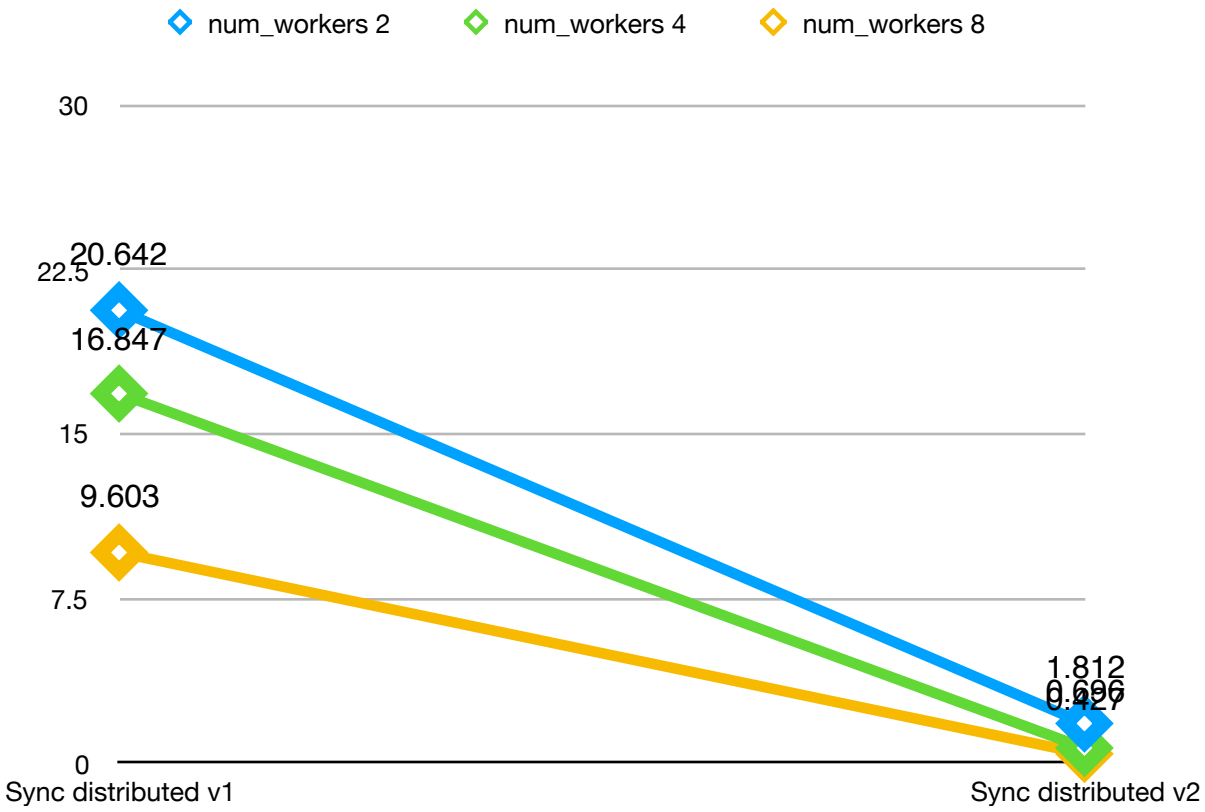
Part 1:
A plot that shows the running time of the above 4 approaches agianst the map sizes f 8, 16 and 32.

The following plot shows how long does it take per each setting and map size. Values are in seconds. As it is obvious from the plot when the map size is lower, it takes less time to do the iteration. Also the Sync distributed v2 and Sync VI v2 did better in terms of duration. However, changing the batch size affects the performance of the Sync distributed v2 which is investigated in the next part.



Part 2:
A plot that shows the running time of both distributed approaches agianst the number of the workers with 2, 4 and 8 workers.

Increasing the number of workers in distributed versions can help iterating over the values and policies faster. The experiments were done on map size of 8. As it can be seen from the plot, both the Sync distributed v1 and the Sync distributed v2 have lower times with more number of workers.



Part 3:
Breifly explain why the second distributed method is faster than the first one?

Because of several reasons. First is that because the data are processed in batches, so that helps to make data processing parallel. Also, the value and policy update functions use arrays for calculations, so less workers would be created in that way and less time would be spent in for loops because of using already prepared well-defined loops.

Part 4:
Compare the best distributed method with the best non-distributed appraoch. Which one is better? Briefly explain why.

It depends on the batch size. If the batch size be too low, then the overhead of making batches takes a long time, and it doesn't worth doing iteration in batches. By choosing the appropriate batch size, the distributed method would be faster that the non-distributed one. Also it depends on the number of workers. If increasing the number of workers would significantly help the Sync distributed v2 to do the iterations much faster as it can be seen in Part 2.