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The problem:

Receive N points that scattered in n-D space, each point has a sign value that classify them to two strangeness groups (Clusters).

* Each point must be at one cluster
* Each point will classify to the cluster that match to her sign (1 or -1).

The mission is to find the first division of a points classification to two groups that meets the require quality (QC). We use linear regression algorithm

OMP:

Uses of OMP:

* Initialize W vector.
* Calculate F(Xi) according the formula.
* recalculate vector W according wrong classification of point.

The number of points dimension is relatively small(up to 20 dimensions), loops that run over the point dimension are better to be parallelized with OMP because the CPU usually can run up to 8 or even 16 threads simultaneously, besides, each thread in the CPU is faster than a GPU thread, so there is no reason to waste time on copying the data to the GPU.

CUDA:

Uses of Cuda:

* We have one loop that run over all the points check their group classification and count wrong classification of point for calculate result quality.

The points amount is a very big number (up to 500000 points). In this case, in loops that run over all the points, I chose to use Cuda because although we should copy memory to the GPU, Cuda has a significant number of threads, and each thread have independent identical task. So in case of a large loop, it is better to use Cuda.