

Chris Jiang 400322193
Sohel Saini 400327615

last in-lab (loop reordering for convolution)

The updated versions of Algorithms 8, 9, and 10 improve efficiency by reordering loops, reducing unnecessary calculations, and optimizing memory access patterns. In Algorithm 8, the outer loop now iterates over the kernel h instead of the output indices n , which improves cache performance and reduces redundant boundary checks. Algorithm 9 precomputes the valid range for n to avoid extra min/max calculations inside the loop. Algorithm 10 applies loop unrolling to n instead of k , processing multiple elements per iteration to take advantage of modern CPU optimizations.

Two optimizations

We were unable to complete this take-home as we got stuck on Take-Home 2. While we successfully ran the test and benchmark code that we wrote, we encountered issues in `PSD_test`, where the `psd_Fixture` test fails due to discrepancies between the results of `estimatePSD` and `matrixPSD`. In `PSD_Bench`, we managed to execute the benchmark, but we suspect that `estimatePSD` is incorrect since the computation time appears abnormal.