Week 6 tasks

August 4, 2021

1. Install and familiarize yourself with the COCO testing suite. It's a powerful, comprensive piece of software for benchmarking and comparing black-box optimizers. Eventually, we'll use this for benchmarking our comparison-based methods.

2. COCO is great, but it is also fairly inflexible. It is designed for zeroth-order (*i.e.* algorithms are given $f(x)$) but we want to use it for comparison based (*i.e.* algorithms are given only the output of a comparison between $f(x)$ and $f(y)$, but not the actual values $f(x)$ or $f(y)$). So, I think the easiest thing to do will be to build a wrapper that goes around any optimization algorithm. This wrapper will:

   (a) Receive two trial points x, y from the algorithm $\mathcal{A}$.

   (b) Give x, y to COCO, and receive $f(x), f(y)$.

   (c) Perform a (possibly noisy comparison) $\mathcal{C}_f(x, y)$.

   (d) Return $\mathcal{C}_f(x, y)$ (which is either $+1$ or -1) to $\mathcal{A}$.

3. Have a look at the CMA-ES algorithm. It is a good zeroth-order algorithm which technically only uses comparisons. The code is good, and well optimized, so this will be a really strong benchmark to compare against.

4. Have a look at some of the talks within this workshop.