- The number of items varried over $\{10, 20, 40, 80\}$ and the decay rate varied over $\{.1, .2, .3, \ldots, .9\}$.
- 100 experiments were run with each item-decay rate pair
- Each coordinate of the true embedding comes from $N(0, 1)$
- Each coordinate of the intialization comes from $N(0, 1000)$ (which is in theory equivalent to scaling $N(0, 1)$ by $\sqrt{1000}$.)
- In the beginning, the triplet constraits were shuffled/randomized once
- One iteration means SGD went through all the data / triplet constraints exactly once and each mini-batch size was 100.
- If the loss did not change (increase or decrease) from one iteration to another, the experiment stopped. (I've seen SGD get stuck where the loss never changes and the gradient is non-zero but also never changes. My best guess is that this is a valid subgradient of the hinge loss at 0 and it's stuck in a local min. I need to investigate this more.)
- All the experiments ended by either finding a successful embedding or ended because the loss did not change from one iteration to the next. In other words, no experiments were terminated becaues they exceeded a max number of iterations.

The plots show the following. I also showed a "zoomed" in version on $n = 40$ and $n = 80$ since the experiments weren't successful on $n = 10$ and $n = 20$.

- Proportion of finding an embedding that satisfies all constraints (will be referred to as successful embeddings)
- Average time in minutes over successful embeddings
- Average iterations over successful embeddings
- Average minimum gap size ($d(x_i, x_j)^2 < d(x_i, x_k)^2$) over successful embeddings. It seems like the more items means smaller gap size. At $n = 80$, the average gap size was below one for all but one decay rate size.
- Average relative frobenius norm error over successful embeddings. The relative frobenius norm error of an original embedding X and (a Procrustes transformation of) the found embedding $\hat{X}_P$ is $||X - \hat{X}||_F$.
- Proportion of number of times final gradient is 0 over successful embeddings.