Spatial State Representations for Deep Reinforcement Learning, Milestone 4
15-400, Spring 2019

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February 27, 2019

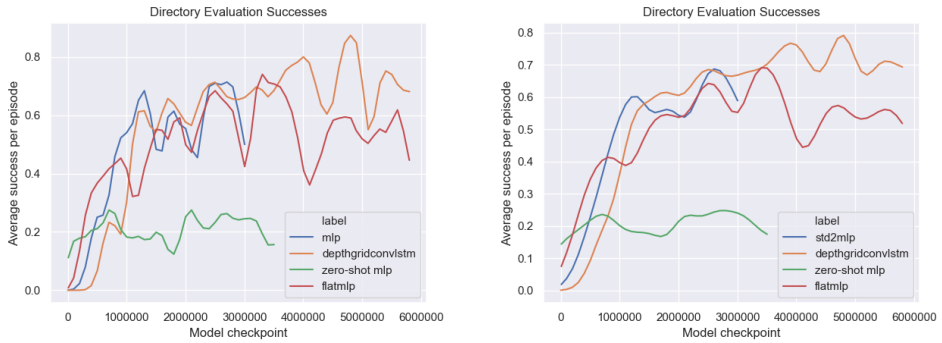

Figure 1: **Left:** Unsmoothed second-round evaluation results of baseline MLP trained on multitask dataset, best spatial model, MLP baseline plus positional information, and MLP trained on canonical body transferred to multi-body dataset. **Right:** Smoothed graph, shows trends better.

1 Major Changes

No major changes. 8 days to March 7th midnight submission deadline for ICLR 2019 SPiRL workshop.

2 What You Have Accomplished Since Your Last Meeting

I spent some time rewriting our evaluation scripts so that we no longer encounter the issue we were having where we could only run 30-40 evaluation processes at a time over all cluster machines. As it turns out, this issue is most likely due to how GNU Parallel groups all semaphores in a single directory `~/.parallel`. However, while this evaluation script does not have the same problems as the previous evaluation script, I may have made a questionable design choice—namely, to save a large statistics file after evaluations for every walker body completed. This may be the culprit behind a big slowdown the cluster experienced this past weekend, since the shared file system may have been overtaxed by the 40-50 concurrent processes writing a not-small statistics file to disk.

I also completed a truly random environment that generates a completely random walker body (based on tolerance parameters listed in a provided JSON file) instead of sampling from a group of pre-generated bodies, and began training models on this new environment just to have another environment to compare our models with the baselines.

3 Meeting Your Milestone

I have finished training models for the third round (I train models for some time, then run evalatuions to completion, then train, etc), and I began evaluations. Unfortunately the `lithium` cluster crashed sometime over the weekend and as of this writing we are waiting on the admins to reinstall the head node and get the cluster back up again.

Otherwise, I've been reading papers and writing the paper—since the extended abstract is 5 pages (basically a short paper), it will be very close to a subset of the full paper rather than an abstract with a fundamentally different purpose than the full paper. The discussion of the results is in progress, to the point where we can almost swap out the graphs from the second-round evaluations to the third-round evaluations and be good to go, since the trends are there.

Also, we have mostly de-prioritized the asymmetric leg bodies since the baseline seems to be fairly strong on that dataset, but we're keeping it on the backburner and hope to have enough compute to run evaluations and have something for the final paper. At this point, training our models for longer on our original segmented-hull bodies is more important.

4 Surprises

The slowdown of the whole cluster that could have been due to my evaluation scripts was a small surprise—hopefully the cluster gets back on its feet soon. I've modified my script to not save as often, and we can always use the old script—since semaphores are there for a reason.

5 Looking Ahead

A week and a day until the submission deadline. It would be nice if the deadline would be extended, but we are not counting on it. Besides completing the paper "final" draft this weekend and plugging in the final evaluation results, there is not too much left to be done before next week. At this point, most models that we can run now probably will not complete in time to be put into the submitted extended abstract, and we can always write what we are currently working on but we can't count on in-progress work to carry our paper. We would also like to clean up our code since we plan to release our JSONWalker environment extension.

6 Revisions to Your Future Milestones

No revisions. The next milestone will be after spring break, and we will basically be continuing training and evaluations on these bodies, and starting work on the raptor body and working on building a MuJoCo simulator environment on which to run 3D models.

7 Resources Needed

According to records, Professor Barnabas Poczos and his PhD student Manzil Zaheer are in charge of the `lithium` cluster, and I may have to bug them a little if the cluster remains down

or transfer model checkpoints to AWS to run evaluations. Besides the cluster being down as of this writing, I have all of the resources I need.