Journal Report 3
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Daily Log

Monday September 16

I found another paper on hierarchical reinforcement learning paper. They include code so it is helpful for when I am modifying it. I also obtained a MuJoCo product key so I can test my models in a good environment.

Wednesday September 18

I delved more into the math behind the paper I found on Monday. I think this paper is really close to what I am trying to do, so I spent a lot of time making sure I knew exactly what each equation meant and how it was derived. in this paper, there are two levels. An upper policy which returns a subgoal to achieve and a lower level policy to achieve that goal. The upper goal makes a goal every c steps. I want to see if I can make n levels. Each level makes a goal for the lower level besides the last layer. C for the bottom layer will be 1. The next layer 10, then 100 , and so on. The other modification is to make it learn which sub policies it really needs at a given time. The rest will be stored in a file system. The policies at the nth level will learn to recall from the file system the weights of the subpolicy it wants to run. SSD's nowadays are pretty fast. I don't think speed should be a problem especially considering that the size of of the file that contains the weights of a model aren't that large.

Friday September 20

With 1/3 of the theory solved, I wanted to return to coding. I implemented a basic CNN for mnist. Tensorflow made this new feature called eager execution, which is a high level api meant for testing. Tensorflow's strength before was employing models, but now I think it has the same capabilities as pytorch. I learned about eager execution and implemented the CNN. The model itself was copied directly from the tutorial. Next week I will implement a better model to get a higher accuracy (right now its at 97 percent). You asked for a deliverable on Friday. I think this technically one, but its not very exciting so I'm changing my goal for next week to make this more unique to show that I learned more about tensorflow.

Timeline

Date	Goal	Met
Today minus 2 weeks	Set up my laptop with all the prerequisite software for working on this project	Yes, I was able to install and use gazebo and pytorch
Today minus 1 weeks	Find a good Hierarchical Reinforcement learning paper to implement	Yes I found one that looks promising, but new ones come out so fast that I may find a better one later
Today	Implement a simple ConvNet in tensorflow on the mnist dataset along with generating the tensor graph to view the accuracy over time	Yes I was able to implement the CNN and see the accuracy over time graph
Today plus 1 week	Implement my own CNN that achieves atleast 99 percent on MNIST	
Today plus 2 weeks	Implement a simple LSTM that will attempt to learn and replicate Shakespeare like text	

Reflection

When I started this project I thought I would be researching forever, but I think the rate at which I'm going at is fine. I can see the end of the tunnel for now. One of the three major areas of research is done. I still need to come up with a test environment for the final project. I was thinking about testing the performance on 3 games. A platformer game like super mario bros is interesting because platformers have a simple overall objective of jumping around to the end. If this model can really learn general policies, it should be able to pass levels at around the same rate even if there are new mechanics.