15-400 Milestone 2
Spring 2019

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1 Milestone Summary

For this current milestone, I am currently looking at HPNet (Hierarchical Predictive Network), a network designed by Professor Tai Sing Lee and another student that more accurately simulates predictive coding theory, and simulating the motion illusions done on the past paper in PredNet. We intend to look at the internal representations of these illusions with HPNet, something that cannot be done with PredNet, as well as other illusions that have strong correlation to Predictive Coding Theory, namely Bi-stable illusions.

2 Current Progress

Since the last milestone, I have been able to focus the project on exploring the expressiveness of HPNet with respect to illusions. PredNet has had some success in being able to "view" illusions in the same manner as humans, but one problem with PredNet is that we are unable to get a satisfactory answer as to why. Since PredNet only feeds predictive errors through its layers, we are unable to access the internal representations of the illusions. HPNet will allow us to access these representations, and by replicating the experiments done with PredNet will allow us to establish a benchmark test.

Currently, I am parsing through the codebase of HPNet. There exists a trained model of the network currently available in our repository, but we may need to retrain it with more training data. As a result, I am preparing for the possibility of needing to retrain and so also need to learn a bit about gpu processing. Professor Tai Sing Lee has recommended me talk to a couple other of his Masters/Phd students to help with these endeavors.

3 Changes and conclusion

Overall, I think we have a good direction with the project, and strong goals that can be reasonably met. One change now though is that I will need access to the CNBC gpu cluster which I am currently in the process of going through. The consistent meetings with Professor Tai Sing Lee are definitely helpful in staying on track and I think we have made good progress with this Milestone