**Bayesian Cats and Dogs**

**Abstract**

Implementing Bayes in Cats and Dogs was a tricky task, with most of the difficulty coming from determining what to analyze and improve over time. It made the most sense to focus on the mouse’s behavior, as it was apparent their primitive AI was preventing them from eating the cheese as fast as possible.

**Primary Question**

The cats could be within the flee radius of a mouse, but if the cat isn’t headed towards that mouse and is focused on something else why should the mouse detract from seeking the cheese?

**Initial Solution**

An ignorance factor is being implemented that will offset both the flee and seek radius of the mice. This will cause them to favor seeking over fleeing depending on the amount of the factor, which will be altered over time depending on observations made every round.

**Conditions & Actions**

The conditions being tracked are the average distances of the mice from the cats/dog, the time the mice spend fleeing, and the time it takes for the mice to eat every piece of cheese. The altered flee/seek radii will change how the mice eat the cheese, thus showing if they have improved from round to round.

**Observation Table**

To determine a “good” outcome the amount of time it takes to eat all of the cheese will be used. If it took less time to eat every piece of cheese this round compared to previous rounds, it will be deemed a “good” iteration. Fortunately it will be easy to learn from “bad” outcomes because if the cheese takes longer to eat, adjustments can be made to improve for the next iteration. “DEAD” denotes that the mice were all caught by the cat.

**Conclusion**

Observing the data gathered, it is very easy to deduce proper seek and flee radii for the mice. Having a seek range of roughly 125 and a flee range of roughly 25, the mice could eat the cheese with ease.