AI First Deliverable

Genetic algorithms based AI to play Flappy birds

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1. First Deliverable

As the first deliverable of the project, we downloaded the flappy birds game in a python setup for the main model to be implemented on. We also sought upon a RL based method that uses Q learning to play the game. The next method was to model and plan out the GA algorithm to be implemented alongside neural networks; we will build a neural network with two input nodes, one based on distance of the bird from the pipe and the height of passing from the pipe, the flapping of the bird will depend on the output. The fitness function for the GA used to improvise the method will be the distance moved till now. We plan to sort and send the top 10 fit individuals to the next generation. The chromosomes for the genetic algorithm are going to be the weight(weight of edges of neural network) vector converted to a string.
We also talked about introducing ant colony optimisation for comparison.For this, the main task is updation after every pillar and the path followed.The ants decide this by moving up or down at every pillar(i.e make a flap or not) and the fitness is dependant on the distance of the bird from the pipe and the vertical position of the bird while passing the pillar.

2. Feedback Questions

2.1. Do you apply GA or RL in games? If GA, then how would you model your problem statement as a GA problem.

We would be applying both GA with Neural Network and RL to the game seperately and our results will be derived from the results of both these approaches. We would also be using ACO(Ant Colony Optimization) to generate and AI for the game. RL and ACO would serve as our performance gauging metrics for our algorithm.

2.2. How to handle "adversary" (pillar)?

Each obstacle for the protagonist would be judged on two metrics: the vertical distance and the horizontal distance from the adversary(here the pillar). These will be edge weights in neural network.

2.3. How will you evaluate your algorithm? How you are going to handle time-series data?

We would first solve this problem using reinforced learning wherein we run it for a finite number of iterations(say 3000) and keep their scores. We would then use a genetic algorithm in form of a classifier and find out the scores it is able to achieve in the same number of iterations.

3. Second Deliverable

We have thought to try and implement the genetic algorithm based ai so that by the final submission we can have the aco and finally compare the results of the three.