TPG - IA Snakes

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Exploration algorithm

We start by attributing a cost to each type of tile, which will be of help when choosing the path with the least cost, helping the snake avoid stones and its own body. Besides that, “visited” tiles with an older age will have less cost, which have a higher chance of having a food in them.

The method “compute_goal_path” uses a ‘heapq’ to expand the nodes with less cost and tests if a tile is valid based on different criterias. This method also allows for different strategies, for example, find the first valid object or explore different ones and then choose the best.

Eating

The snakes eats every food it sees, making it its goal whenever there's one in its sight.

In the beginning, the snake only eats a super_food when it has already seen 5 of them. After eating one, if the sight range drops below 3 or Traverse becomes False, it will eat every super_food that appears in its sight until both previous conditions become false, otherwise, it will do the same that it does in the beginning. If the sight range becomes 5 or higher and Traverse is True, it will try to avoid eating super_foods.

Safety

The method ‘flood_fill’ uses a ‘deque’ to store to-be-explored tiles and the current direction. It also contains a counter that includes the number of accessible tiles. When the counter reaches or exceeds a certain threshold, it is possible to terminate the calculation of accessible tiles before it ends.

To avoid the snake trapping itself with its own body, it’s used a BFS search to explore possible paths and the method ‘flood_fill’ previously mentioned to evaluate the accessible space around the goal tile.

Multiplayer approach

In the multiplayer mode, we decided to make it so that the snake detects the enemy snake's body and tries to guess where its head is. It will also mark the tiles close to the other snake as dangerous, increasing their cost. Apart from that, the snake behaves the same as it did in the singleplayer mode, searching for the foods and eating them and only eating super_foods when the conditions previously mentioned were True.

Conclusion

Overall, the snake behaviour was what we expected as we were developing the code and the results were also good. If we were to continue developing the agent, one thing we would try to implement would be to, in multiplayer mode, make the snake try to surround the enemy snake, making it go into one of the snakes' bodies so that it dies.