Bot AI for *Agar.io* Game

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Problem Statement

Agar.io is a web-browser based multi-player real time strategy game. Each player tries to grow and survive attacks from other bigger players. The objective of the game is to grow, by engulfing different types of pellets as well as other players and stay alive as long as possible. As a cell grows, it gets slower. The challenge is to survive as we get slower whilst growing. The scope of our project to build a competitive bot that plays this game.

Approach and Techniques Involved

- Collision Avoidance: Player has to avoid collision with viruses and bigger cells
- Flee: Player has to continuously flee from opponents that are at least 25% bigger than themselves as they will most likely pursue the player to consume it
- Pathfinding: Player has to look for smaller cells and has to reach them to consume them and thus scoring points. Player also needs to do find pellets which also increase score.
- Strategy to Split: Player becomes slower as they become bigger, so in case where more speed is needed, player has to split.
- Strategy to Shoot: Player can hit in the direction of virus and split it into smaller parts, which can be helpful to split the enemy cell roaming the other side of virus.

Evaluation Methods

Agar.io is a never ending game so the goal of the game is to stay alive as long as possible and increase mass as high as possible. Also top 10 players on the map can be seen in the leaderboard.

We will evaluate different algorithms and find the best suitable for the desired goals. Different techniques listed above will have different priority and we would find the best weightage by evaluating the performance of the bot.

We can evaluate our algorithms based on:

- Highest position achieved on the leaderboard
- Time on the leaderboard
- Total survival time session
- Statistics at the end of session

Importance of Project

Agar.io is a simple game but being a real-time and multiplayer strategy game, building a bot for it involves complex strategies and manuvering. Techniques used to develop the bot will help us understand applications of AI techniques in Game Development. Developing bots for new, trending games, such as *agar.io*, would be a step in the direction of the collective effort of solving such problems.