- CS 205 Artificial Intelligence -

Pacman Project - Final Report

Coming into the project, all of us were familiar with the pacman game but were unsure specifically how we would implement elements of AI to learn more about how to come closer to a solution to the game. After each week, our understanding grew. This was helped along by seeing how to represent a game state, expanding nodes given a starting position on various different board sizes/types with various algorithms, and seeing how heuristics can improve the amount of nodes expanded.

Week 4 Accomplishments/Learnings Summary:

- Implementing the four search algorithms was helpful in terms of the project and the class as a whole. It was good for us to have to think about how to implement these algorithms once again after seeing them during lecture and from past courses/work. The biggest takeaway from these implementations was making them work with the problem state. It took us some time to understand what attributes were necessary to track for each algorithm. For example, we needed to track each states' cost when implementing the priority queue in UCS and Astar.
- We feel that the questions required for us to answer in the first few problems were very helpful in gaining a better understanding after implementing the search algorithms. We enjoyed this part of writing the report, as it made it less tedious than simply posting screenshots.

Week 5 Accomplishments/Learnings Summary:

- In a typical game of pacman, there are usually more than one piece of food available for pacman to consume. This week's work made this problem more apparent by defining a goal state as having visited all pieces of food on the map (corners in this case). Seeing the corners problem and needing to define/implement the class and game state were challenging but fun in this section. Also having the other classes already implemented to gain an understanding of how things work was very helpful.
- Another challenging aspect of this part was understanding admissible vs consistent heuristics. After reading online and implementing/testing a few different heuristics, we were able to come to a solution which worked well and passed all cases.

Week 6 Accomplishments/Learnings Summary:

- Week 6 was pretty enjoyable for us since most of the groundwork had already been completed. After gaining an understanding of heuristics in week 5 and completing the algorithms in week 4, we felt that implementing the heuristic for the greedy search on the more sophisticated maps was easier to understand and had better flow.
- Additionally, we liked that the majority of the classes had already been defined, so making our heuristics and goal state methods was more seamless but still somewhat challenging.

Overall Thoughts:

- Given that Pacman is such a popular game and we all had an understanding of it before starting makes for a good project where we need to implement things we may have not seen before. This made implementing the agent classes and heuristics easier, since we were not confused by what was happening during the game.
- We feel that it may have been more interesting to add in more conceptual questions in the report for weeks 5 and 6 to further help our understanding of the implementations.
- We also feel that having to completely implement the class from week 5 was a bit tedious with type casting and debugging small issues to make the class work with the search algorithms, but at the same time it was helpful in that it made sure we had a good understanding of the class and how it should be represented.
- At the risk of sounding cliche, we are most proud of the fact that we were able to successfully complete the project within the given time constraints and our differing schedules.

Team Dynamic/Challenges:

- We think that having teammates for this project is very helpful and makes it more enjoyable, as we are able to bounce ideas off one another. Each week the amount of work felt just right since we were able to split it up amongst each teammate.
- Since we are all on different schedules, it was challenging to get everyone to meet physically, but we managed to meet on several occasions and also work together via discord/zoom to help with debugging and brainstorming.
- It was also hard to meet the deadlines, since all of us are applying for jobs/internships and working on different coursework/projects.