Game Solver

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1 Introduction

There are many board games or certain aspects of board games that seem very amenable to algorithmic solutions! For example, given a set of dominoes, what is the longest dominoes path we can make, where 2 dominoes can be connected on the side that shares the same number of dots. This project would solve these types of problems for us in a user-friendly way, perhaps an app!?

We need to determine how to get all these different components into an app and make it user presentable! Are we going to use swift, or react? Can the app run sub-processes in python for the image processing and maybe java for the game algorithms? How do we display things clearly so that it is easy for the user?

2 Task 1: Determine Game State

One important issue is that the game solver needs to know the current state of the game! What use is a solver if it has nothing to solve :(However, entering the game state is NOT user-friendly! Imagine having to input every single domino and its relation to all the other dominoes!? Horrendous!!

The solution to this is to use computer vision! Imagine if you could just take a picture of the game state and the algorithm would automatically solve the problem for you! Amazing! User-friendly! And very amenable to an app on a phone! :)

Note that we will need to either find a data set online or actually take images ourselves and make a data set! Can we get our friends to help take images so that we have more diversity in lighting and game style layouts, etc.? How do we need to pre-process our data to make it work? What is the accuracy of our algorithm? If it's not good enough, is it even worth making this part of the app? Is it more frustrating than useful??

3 Task 2: Solver Algorithm

Now that we have the state of the game, we need to actually solve the problem! In this section, we write an algorithm to solve the actual problem given the

input state. We need to remember what the output should be such that it makes sense for the user!

4 Task 3: Display the Output

Now that we have the output of the program, we need to actually display it to the user in an easy way! The user should automatically understand how the solution works. Maybe we modify the picture to show them where to place the tile, or visually show the longest possible dominoes path!

5 Task 4: Conclusion

Write a summary of our results and key decision choices made. We have now completed the project once you have hit this stage! That is very exciting! :)

Some key questions might be determining where our image processing fails or messes up. Can we tell the user, we are unsure of something to have them confirm or deny our guess at the image? Is our algorithm fast? Is it a heuristic? How do we tell the user how long they have to weight or that our solution is only a heuristic of the most optimal solution? How do we determine how close to the optimal solution we are and let the user know? Can they test a solution they have against ours and determine which one is better?