Project Proposal

Project Description:

- Game title: Live by Daylight
- Live by Daylight is a one-player top-down view 2d game where player needs to escape from the gate by opening one of the chests. Meanwhile, the AI killer will wonder around different areas in the map to find the survivors. After being attaced twice, the survivor will be brought to the jail. And if the survivor is brought to the jail twice, it dies. The game ends if the player escaped or died.

Competitive Analysis:

The core algorithm of this project is code of the game AI for the killer. Consider that the information of the survivor is available for the killer, A* search projects will be similar to my inteded code for finding the closest path from the killer to the survivor. However, a condition of the distance between the killer and the survivor is added, so the survivor will only be “discovered” and chased by the killer within a certain distance. When not chasing any target, the killer will wander around areas in the map. Also, the shortest distance will be constantly changing due to character motion, thus the shortest route will be updated every time interval.

This project is adapted from the horror game Dead by Daylight, so the game structure is very similar to it. However, the scale is slightly reduced to a single player game with an AI enemy. The player will be the survivor that aims to escape from the map, and the killer will stop the survivor from escaping by attacking them. After two attacks, the survivors will be brought to the jail. If a survivor enters the jail twice, it dies. As the survivor being controlled by the player dies, the game is over. To open the gate, the survivors have to open one of the two chests on the map. Then, if the player arrives at the gate, the player wins and the game ends.

Structural Plan:

- The processes of the chests and the game status are constantly tracked in the timer fired function, and the main app message is updated correspondingly. The A* algorithm that calculates the closest path to the target is triggered every time interval to update the path and direct the killer’s motions. The survivor AI is also updated every time interval in the timerFired function.
- Key presses are used to control the movement of survivor A as well as actions such as opening the chest.
- The obstacles including the walls in the map are organized in the class of obstacles and the subclass of passable obstacles such as the gate and the jail. The characters belong to either the killer or survivor subclass of the character class that records their status, data, and creates character stripe animations.

Algorithmic Plan:

The most difficult part of my project is the game AIs which include the killer AI and survivor AI:

Killer

- When there is no survivor in a certain radius around the killer, the killer goes around the court clockwise to search for survivors.
- When a target has been discovered by the enemy, A* search will be used to find the closest path from the killer to the survivor and direct the movement of the killer.
    - The origin point is first set at the location of the killer, while the end point is set at the location of the target survivor and updated every time interval. The origin point is the first “current node” being investigated.
    - From the current node, find every valid child node and calculate its f value, which combines the certain distance from the origin and the

estmated distance from the child to the end point. Then, this child node is added to the list of nodes that will be later investigated (yet to visit list).
        - Then find the next current point based on low f value and the generation of node. Which means the node with lowest f value in the yet to visit list will be the next "current node" to be investigated because small f value is preferred (indicate short distance), and usually small generation leads to small f so the default current node is the 0th node in the list (generally sorted by generation due to the mechanism of appending).
        - If the current node is already the end point, the data of this node will be translated to a path by retrieving backwards through the parent data stored as one of the attributes of the node object. The path will later be used to move the killer through the grids.
    - While bringing a dying survivor to the jail after two attacks, the killer will ignore the other survivor.

Survivor

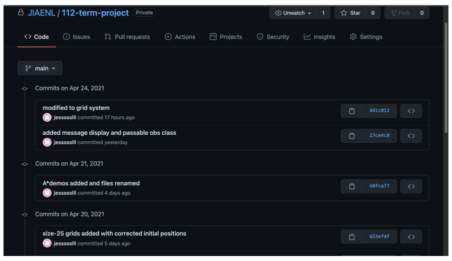
- When the killer is not in a certain radius around the survivor AI, it will approach the closer chest to start opening the chest. (path will be found using the same A* algorithm described above)
- If the killer is in fact within the radius of detection, the survivor AI starts to escape by the following logic.
    - The opposite direction from the survivor to the killer will first be calculated and used as the default direction to escape.
    - If the direction eventually leads to a ablind alley on the terrain, the angle of the direction vector will either start to increase or decrease by random selection in order to detect a possible route.

Timeline Plan:

- 4/26: complete chest opening mechanism and game over detection
- 4/28: complete enemy default route
- 4/29: complete enemy algorithm including path search and attack detection
- 5/1: complete jail mechanism
- 5/3: complete survivor B algorithm

Version Control Plan

- The code and files of this project will be constantly backed up on GitHub whenever a new feature is added or a major change in code is made.



Commits on Apr 24, 2021

modified to grid system
jessssslll committed 17 hours ago
d41c812

added message display and passable obs class
jessssslll committed yesterday
27ce4c0

Commits on Apr 21, 2021

A*demos added and files renamed
jessssslll committed 4 days ago
68fca77

Commits on Apr 20, 2021

size-25 grids added with corrected initial positions
jessssslll committed 5 days ago
653ef4f

Module List:

- As the main part of this project based on A* algorithm, no extra modules is planned to be used. But there is still a possibility that PyAudio will be used in later stages just to add some background music.

TP2 Update

- None