

A* PATH FINDING ALGORITHM

PROJECT REPORT

TEAM MEMBERS:

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DATA STRUCTURES USED:

- Graphs
 - Vectors (Dynamic arrays)
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CLASSES AND ITS MODULES USED:

1. Olc::PixelGameEngine:

- This is the external library used for the Graphical interface of the application.*

2. Pathfinder:

- Pathfinder Constructor*
 - Used to Initialize the data members of the class.
- Pathfinder Destructor*
 - Used to Deallocate memory, which was allotted for the Grid Pointer Variable.
- OnUserCreate()*
 - This is an Overridden function of the olc::PixelGameEngine class.
 - This Function allocates memory for the Grid Pointer Variable and also assigns the neighbors for all the points on the grid.

- The Function also is used to randomly generate obstacles on the grid.

iv. *Heuristics()*

- This function returns the heuristics of a point on the grid.
- It is a guess distance between current vertex and the end vertex
- Distance is calculated using 2d coordinate distance formula
- The value returned by this function is used in the finding the path.

v. *FindPath()*

- This function implements the A* Algorithm and stores the shortest path from source to Destination avoiding all the obstacles.
- $F(x) = G(x) + H(x)$

vi. *OnUserUpdate()*

- This is an Overridden function of the `olc::PixelGameEngine` class.
- This function gets called repeatedly throughout the program run.
- This is responsible for calling the `PrintPath()`, `PrintTitleBar()`, and `PrintMenu()` Functions.
- This function also helps in toggling the obstacle state of the points on the grid.

vii. *PrintPath()*

- This function is used to graphically draw the grid, as well as trace the Solved Path on the Grid.

viii. *PrintTitleBar()*

- This function prints the title bar of the GUI.

ix. *PrintMenu()*

- This function is used to print the side menu of the GUI.
- This function also implements features such as showing only diagonal path, changing the source point or end point, etc.

- The function also prints the distances that each path covers.

CONTRIBUTIONS:

1. Aaditya Prabu K

- a. Heuristics()
- b. OnUserUpdate()
- c. FindPath()

2. Amaraja Vijayakumar

- a. Basic Definition of Pathfinder Class
- b. Pathfinder Constructor and Destructor
- c. OnUserCreate()

3. Saisathish Karthikeyan

- a. PrintPath()
 - b. PrintTitleBar()
 - c. PrintMenu()
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OUTPUT:



