Project 1 FAQ

Q1: What is the definition of Threshold?

Assuming all the grids in your program have different number of crime rates, all the numbers are reordered in an descending order. Therefore, if the threshold = 50%, we take the numbers that are greater or equal to median number marked as block area; if the threshold = 75%, we take the numbers that have index (= 0, 1, 2…) less or equal to total number of grids*(1-75%) marked as block area; if the threshold = 90, we take the numbers have index less or equal to total number of grids*(1-90%) marked as block area.

For example, we have the sequence{10, 9, 8, 7, 6, 5, 4, 3, 2, 1}
If the threshold = 50%, the numbers {10, 9, 8, 7, 6} are considered as blocks;
If the threshold = 75%, the numbers {10, 9, 8} are considered as blocks;
If the threshold = 90%, the numbers {10, 9} are considered as blocks.

Q2: When designing my heuristic research, what map should I use?

We use the grid map as an example.
First, your program should show the map created using the “crime_dt.shp” file.
Second, plot the map you use when find the optimal path.
Third, start time stamp and draw the optimal path on your map.
Here are some rules need to be followed when finding the optimal path.

1. Try to avoid the block areas.
2. all the edges between two block areas and its diagonal are forbidden.(see Fig(1));
3. All the edges between one block(yellow) and one low crime rate area(blue) are accessible and the cost of this edge is 1.3 (see Fig(2));
4. All the edges between two low crime rate areas and diagonal are accessible. The cost of this edge = 1 and diagonal cost = 1.5 (see Fig(3));

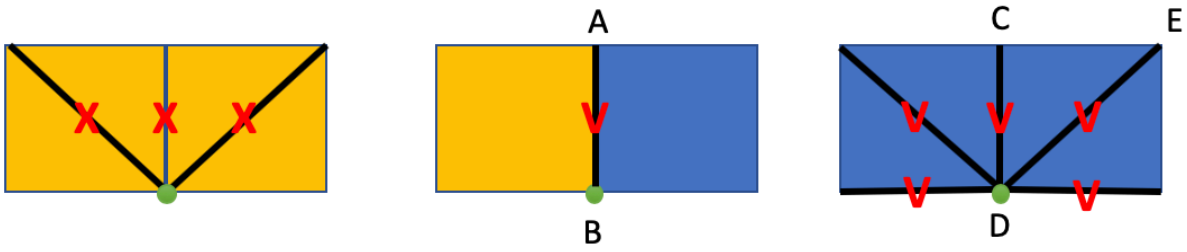

Fig (1) Fig (2) Fig (3)

● - Start Point; X- forbidden; V- Accessible;
Cost: B→A = 1.3; C→D = 1; D→E = 1.5

5. All the boundary edges of the map are considered as inaccessible.
6. If the point P is located inside one grid, use the lowest coordinates in this grid as the location. This coordinate is the left bottom coordinates of this grid.

Q3: Do I need to output all the values (total number in each grid, average/mean, standard deviation of all the grids) in my program?

Yes, you need to output all on the screen. Please note the output should be varied according to the different input size of grids and threshold.

Q4: How should measure the running time of my program when find the optimal path?

If there is no path will be found from the current map, e.g. the destination are surrounded by blocks, your program should output the message "Due to blocks, no path is found. Please change the map and try again";

Otherwise, if the path exists, your program should measure the time when starting to find the optimal path. If it takes more than 10 seconds, your program should output the message "Time is up. The optimal path is not found."

Q5: For Bonus1,

You program should present two graphs with optimal paths using different heuristic algorithms.

Q6: For Bonus2, how should I choose the start and end points?

Bonus 2 is based on the whole map of Montreal area. The program should be able to present the crime rate in the whole map. The start and end points will be chosen arbitrarily in your demonstration.

Please note: your demonstration will use lab machines. The software is **Jupyter Notebook**. We strongly recommend you to use these libraries: **Numpy, Pandas, GeoPandas, Pyshp, Scikit-Learn** for implementation. If you choose other libraries, you are responsible for installation and testing the lab environment before your demonstration.

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