

Simulated Annealing and Hill Climbing

Limitations :

The *hill climbing algorithm* has a few limitations as it can't tackle these issues:

- Local Maximas
- Plateaus
- Ridges
- It gets stuck near maximas
- It is unable to get over plateaus without the addition of a sideways move

Solution :

Some proposed solutions are :

- We propose the addition of *directionality* to the existing simulated annealing algorithm.
- We would also like to change the temperature function, and look at how changes to the value of T would affect the solution found. This could be achieved by looking at the value of T as an independent function, or by making T dependent on the heuristic as well.
- Another change we would like to propose is to change the heuristic to reflect further changes in the directionality of the robot.
- We would also map out a *fuzzy image of the topology* of the entire area, thereby allowing us to find subsequent minimas and maximas and thus saving precious time.
- Heuristic dependent on the *displacement* from the last maxima and starting point.

Methodology :

- Simulate our algorithm with 2-D and 3-D models of mountain ranges (Topographic maps and models).



- From this we can easily find global maxima which then makes our algorithm highly efficient.
- The results given by this algorithm will be compared with existing models derived from various other common algorithms.
- We will repeat the same process on multiple terrains and calculate the correctness and efficiency of our algorithm, i.e, number of maximas found, probability of a bad move, etc.
- This will eventually help us to generate a fuzzy image of the terrain/model.

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