



University of Girona

Spain

Autonomous Robotics

Lab 1 - Potential Functions – Brushfire algorithm and Wavefront planner

Submitted by :

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1 Introduction

The lab autonomous robotics is mainly based on path planning algorithms for autonomous navigation in the free environment. Most of the algorithms are been taught as course class-work and accordingly implemented in the lab. The lab 1 focus on two path planning algorithms named brushfire and wavefront. All the algorithms are implemented in MATLAB and the results are observed accordingly.

In this lab work, we will describe about the way of implementing algorithms, results and the problems faced.

2 Brushfire Algorithm

This section explains about the brushfire algorithm based on MATLAB. As per the given set of rules we are using 8 neighbourhood connectivity. The function is predefined in the given pdf as:

$$function[valuemap] = brushfire(map)$$

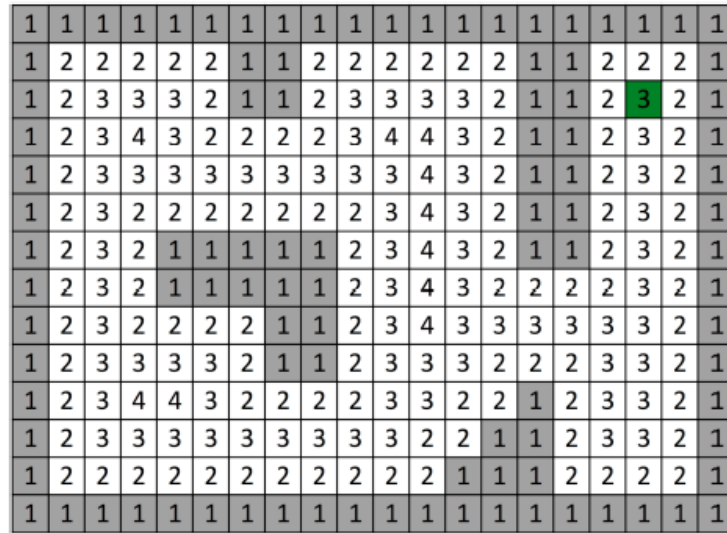


Figure 1: Map of brushfire algorithm

3 Wavefront Planner Algorithm

The wavefront algorithm is used to plan the path between obstacles and the robot. We have the predefined function as given in pdf and it is given as:

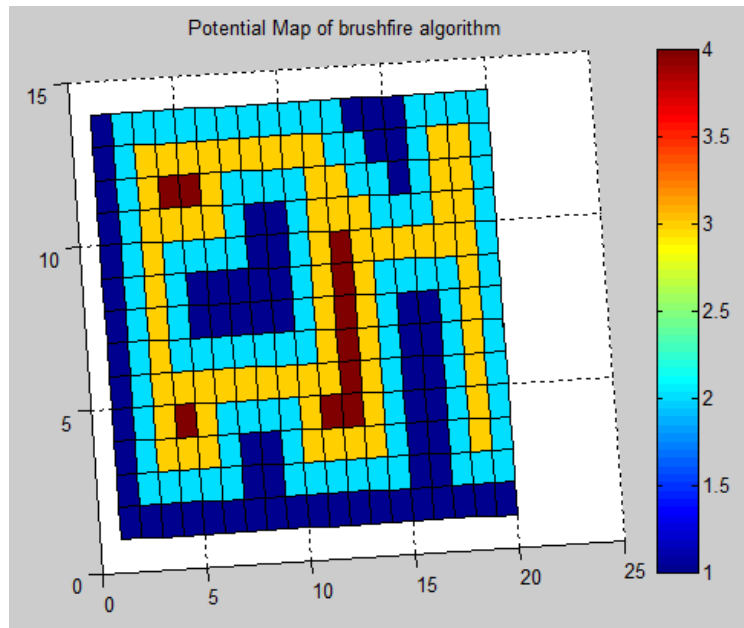


Figure 2: Brushfire plotting

$function[valuemap, trajectory] = wavefront(map, start, endpoint), [goal_{row}, goal_{column}])$

For the wavefront we have tested the result for three different maps like map, maze and big maze. The results are levelled as:

The coordinates for map are:

$[valuemap, trajectory] = wavefront(map, [13, 2], [3, 18])$

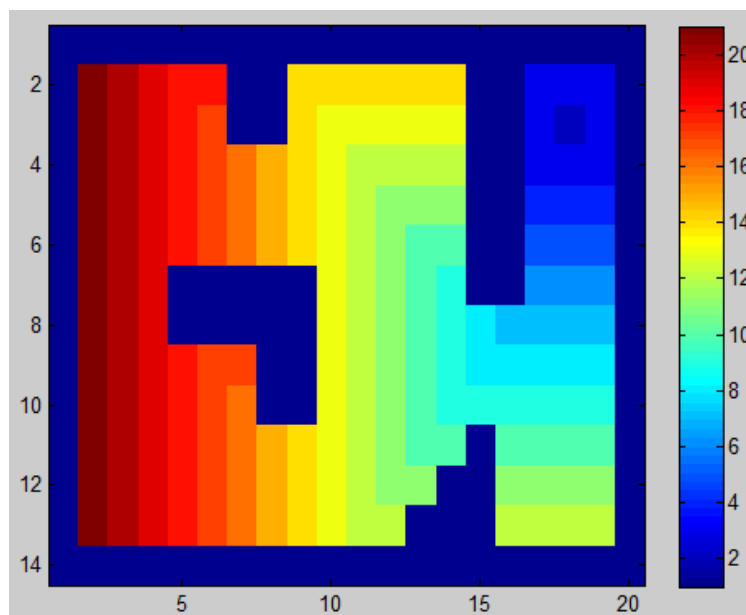


Figure 3: Wavefront for map