SC627 Assignment 2 report

180100049 – Hemanth Dontamsetti

After implementing potential function algorithm I encountered following problems and observations

1) Not reaching the Goal

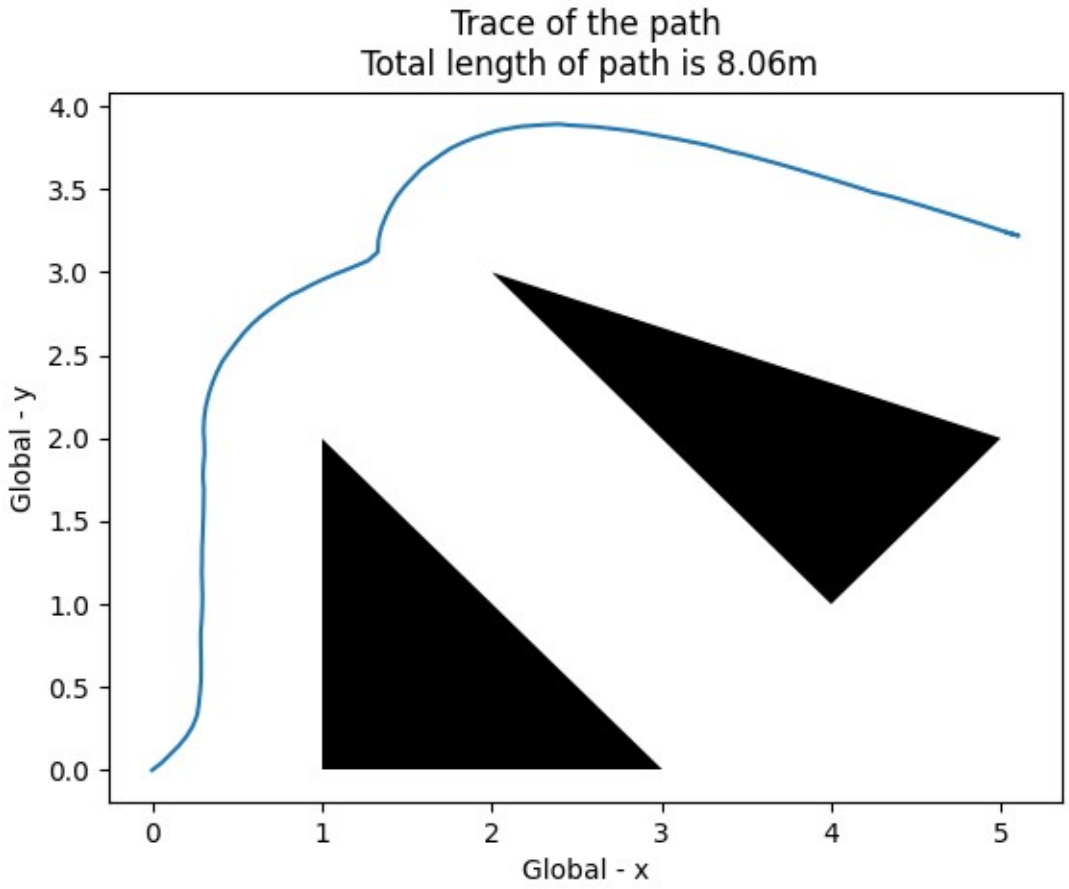


Fig 1: Trace of the turtlebot3 robot using Potential function algorithm. Observe that it doesn't end at goal (5,3) exactly.

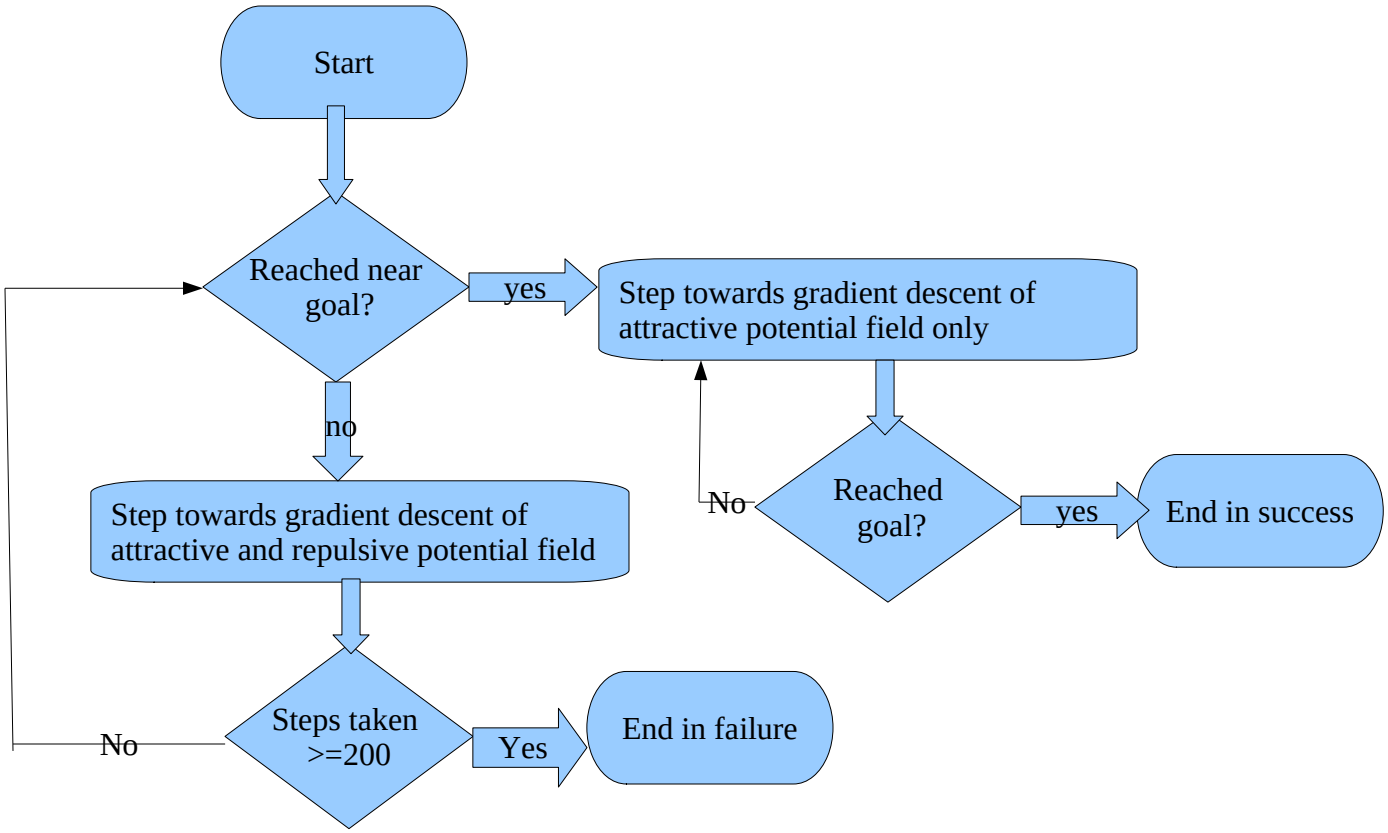
If $d(q, q_{goal}) \leq d^{*}_{goal}$ then attractive force component decreases linearly. If the obstacle is near to this region then repulsive would be still present. So the combination of attractive and repulsive potentials can make a point different from goal as global minimum. So just using

Solution : After reaching close enough to goal only attractive potential is used.

2) Unwanted continuous rotating of the robot at place

Solution : added a timeout to wait_for_result method and if resulted in timeout another goal is picked which is the middle of current_position and next position; this eliminated the problem (but if timeout is resulted in second time as well then program stops with a warning)

Flow chart of Modified Potential function algorithm



- ➔ A video of trace of last few steps of the path followed by the turtlebot_3 is the same folder named PotentialFunction_ROS.mp4. Fig2 shows total trace of the bot.
- ➔ Potential function method took 4 min 17 sec to complete with Success Flag , traveling a distance of ~ 8.1m whereas Bug_1 took *12min 14 secs* to complete with Success Flag , traveling a distance of ~ 25m

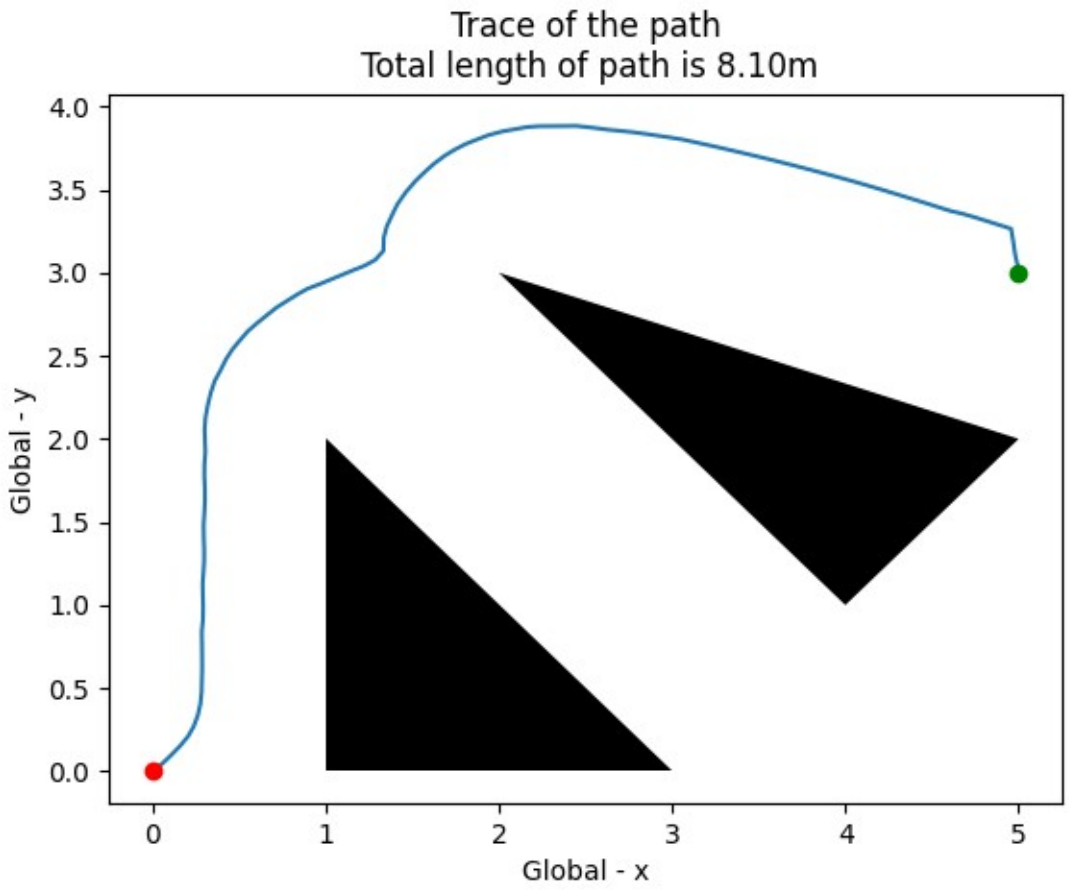


Fig 2: Total Trace of the turtlebot3 robot using modified Potential function algorithm