

Implementation of Robot Behaviour Learning Simulator

Kushagra Singh Bisen

Ecole des Mines de Saint Etienne

kushagrasingh.bisen@etu.emse.fr

July 1, 2021

A recap.

In the last meeting, we discussed a basic method for making the log file work. The problem we faced was related to the tumbling window we would require for the robot to move from the start position A and the end goal position B.

Agenda for Meeting.

Today, we will see a demo log file method that I tried to implement.

Method

I used the costmap2D library and split the whole map into small boxes with values between [0-255], these values define the 'free'ness of the space for the to move around. I used python's list data structure and traversed the adjacent 8 neighbours of the robot in the current space and appended the list incase I had to add it's position and the type of space.

```
[ INFO] [1625116189.991522423, 779.2730000000]: Got new plan
[ INFO] [1625116189.991522423, 779.2730000000]: Goal reached
[INFO] [1625116142.4349580, 795.4180000]: [['(1,2)', 'Free'], ['(2,1)', 'Free'], ['(2,3)', 'Free'], ['(3,2)', 'Free'], ['(1,1)', 'Free'], ['(1,3)', 'Free'], ['(3,1)', 'Free'], ['(3,3)', 'Free']]
[INFO] [1625116142.4349580, 795.4200000]: -1467
[INFO] [1625116142.4588664, 795.4250000]: Dijkstra: Done with initialization
[INFO] [1625116151.297372, 799.8280000]: Dijkstra: Done traversing nodes in open_list
[INFO] [1625116151.389944, 799.8350000]: Dijkstra: Done reconstructing path
```

```
[INFO] [1625116151.386328, 799.8380000]: ***** Dijkstra execution metrics *****
[INFO] [1625116151.318426, 799.8390000]: Total execution time: 4.412 seconds
[INFO] [1625116151.314888, 799.8410000]: *****
```

```
[ INFO] [1625116151.666888815, 800.0160000000]: Got new plan
[ INFO] [1625116184.162337807, 816.2160000000]: Goal reached
[INFO] [1625116365.948872, 906.8510000]: [['(1,2)', 'Obstacle'], ['(2,1)', 'Free'], ['(2,3)', 'Free'], ['(3,2)', 'Free'], ['(1,1)', 'Obstacle'], ['(1,3)', 'Obstacle'], ['(3,1)', 'Free'], ['(3,3)', 'Free']]
[INFO] [1625116365.951591, 906.8530000]: -646
[INFO] [1625116365.968814, 906.8550000]: Dijkstra: Done with initialization
[INFO] [1625116384.825292, 915.8340000]: Dijkstra: Done traversing nodes in open_list
[INFO] [1625116384.829363, 915.8400000]: Dijkstra: Done reconstructing path
```

```
[INFO] [1625116384.833657, 915.8420000]: ***** Dijkstra execution metrics *****
[INFO] [1625116384.837976, 915.8450000]: Total execution time: 8.986 seconds
[INFO] [1625116384.842787, 915.8460000]: *****
```

```
[ INFO] [1625114402.047012247, 84.8370000000]: Goal received
[INFO] [1625114405.421982, 86.5210000]: [['(1,2)', 'Free'], ['(2,1)', 'Free'], ['(2,3)', 'Free'], ['(3,2)', 'Free'], ['(1,1)', 'Free'], ['(1,3)', 'Free'], ['(3,1)', 'Free'], ['(3,3)', 'Free']]
```

ense_eri_robot_dijkstra.py 94.8 demo-log.csv x

```
log > demo-log.csv
1 "['(1,2)', 'Free'], ['(2,1)', 'Free'], ['(2,3)', 'Free'], ['(3,2)', 'Free'], ['(1,1)', 'Free'], ['(1,3)', 'Free'], ['(3,1)', 'Free'], ['(3,3)', 'Free']"
2 -
```

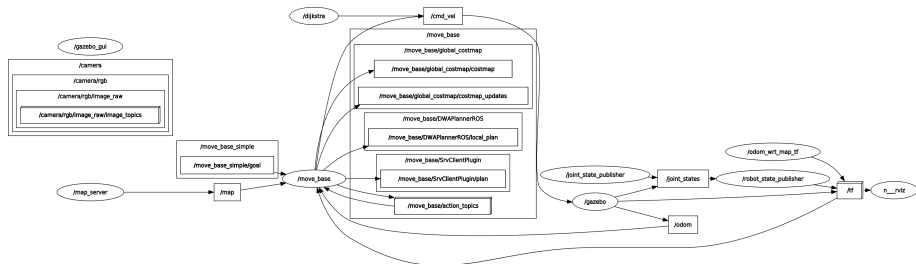
Problems currently faced.

The logic used above was able to print the value repeatedly at each step but due to the irreugarities between the difference of end node position and start node position, there was an error in logic. I am also not certain if the increment by 1, with $i = i + '1'$ (let me know if you wish to see the python logic) or not.

Further Work

- I will work on how to iterate the value over the destination nodes.
- I have also made a `plan[]` list before in the process so maybe it will help me see log the movement (rotation) metric to the log file at each step (Not sure, but I will see)
- I will also try to check if the move base node can help us to iterate over the planned path.

RQT-GRAPH describing the nodes and topics involved.



Thank you for your time.