

Target Driven Navigation

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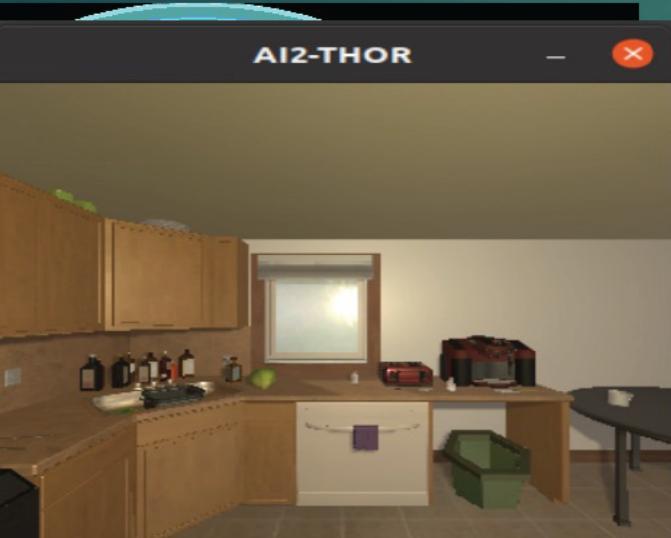
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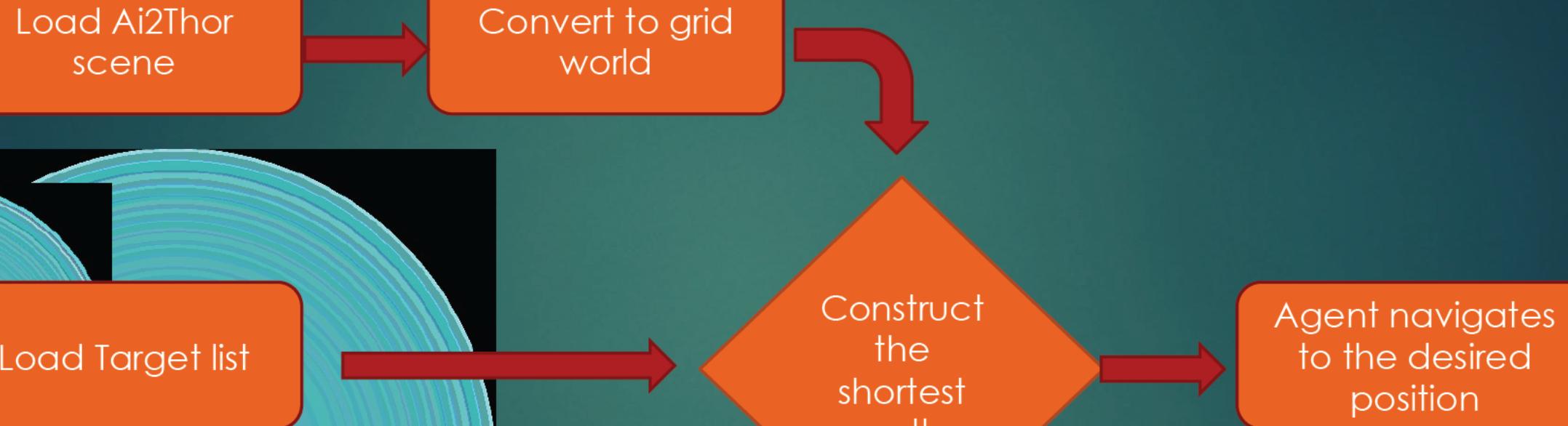
Aim - To move the agent to a desired target location present in the environment by navigating in the shortest path using the grid world.

Environment

- ▶ AI2THor Kitchen scene



Flow of the code



Methodology

- ▶ Convert the Ai2Thor scenes into a grid world using the x and z axis (top view)

▶ All calculations are done based on the grid settings

- ▶ Grid size – 0.25m

▶ BFS Shortest path

▶ Collision Avoidance

- ▶ Navigation - using the controller commands

Navigation with target - Fridge

Activities < thor-Linux64-a634e28ea55b149... ▾ Dec 3 18:11

shashank@shashank-VirtualBox: ~/Project

AI2-THOR

1.py

```
shashank@shashank-['x': 0.25, 'y': 1  
0.0 0.0 -2.0 -1.75  
MoveAhead MoveBack  
shashank@shashank-  
0.0 0.0 -1.0 -1.25  
MoveBack MoveAhead  
Traceback (most re  
  File "run1.py",  
    obj.get_next()  
  File "run1.py",  
    dist,rco,gridc  
IndexError: index  
shashank@shashank-['x': -1.75, 'y':  
0.0 0.0 -1.0 -1.25  
MoveBack MoveAhead  
shashank@shashank-['x': -2.0, 'y': 0.9009992480278015, 'z': -0.5]  
{'x': -2.0, 'y': 0.9009992480278015, 'z': -0.5}  
0.0 0.0 -1.0 -1.25  
MoveBack MoveAhead MoveRight MoveLeft  
shashank@shashank-VirtualBox:~/Project$ python3 run1.py  
{'x': -2.0, 'y': 0.9009992480278015, 'z': -0.5}  
{'x': -2.0, 'y': 0.9009992480278015, 'z': -0.5}  
0.0 0.0 -1.0 -1.25  
MoveBack MoveAhead MoveRight MoveLeft  
shashank@shashank-VirtualBox:~/Project$ python3 run1.py
```

Navigation with target – Apple and chair

Activities thor-Linux64-a634e28ea55b149... Dec 3 17:48

shashank@shashank-VirtualBox: ~/Project

AI2-THOR run1.py

```
shashank@shashank:~/Project$ ./run1.py
{'x': 0.25, 'y': 0.0, 'z': -2.0}
MoveAhead MoveBack
shashank@shashank:~/Project$ ./run1.py
{'x': 0.0, 'y': -1.0, 'z': -2.0}
MoveBack MoveAhead
Traceback (most recent call last):
  File "run1.py", line 1, in <module>
    obj.get_next()
  File "run1.py", line 1, in get_next
    dist,rco,grid
IndexError: index 1 is out of bounds for axis 0 with size 1
shashank@shashank:~/Project$ ./run1.py
{'x': 0.0, 'y': -1.0, 'z': -1.25}
MoveBack MoveAhead
shashank@shashank:~/Project$ ./run1.py
{'x': -1.75, 'y': 0.0, 'z': -1.0}
MoveBack MoveAhead
shashank@shashank:~/Project$ ./run1.py
{'x': -2.0, 'y': 0.0, 'z': -1.0}
MoveBack MoveAhead
shashank@shashank:~/Project$ ./run1.py
{'x': -2.0, 'y': 0.9009992480278015, 'z': -0.5}
```

run1.py



Activities thor-Linux64-a634e28ea55b149... Dec 3 17:52

shashank@shashank-VirtualBox: ~/Project

AI2-THOR run1.py

```
shashank@shashank:~/Project$ ./run1.py
{'x': 0.25, 'y': 0.0, 'z': -2.0}
MoveAhead MoveBack
shashank@shashank:~/Project$ ./run1.py
{'x': 0.0, 'y': -1.0, 'z': -2.0}
MoveBack MoveAhead
Traceback (most recent call last):
  File "run1.py", line 1, in <module>
    obj.get_next()
  File "run1.py", line 1, in get_next
    dist,rco,grid
IndexError: index 1 is out of bounds for axis 0 with size 1
shashank@shashank:~/Project$ ./run1.py
{'x': 0.0, 'y': -1.0, 'z': -1.25}
MoveBack MoveAhead
shashank@shashank:~/Project$ ./run1.py
{'x': -1.75, 'y': 0.0, 'z': -1.0}
MoveBack MoveAhead
shashank@shashank:~/Project$ ./run1.py
{'x': -2.0, 'y': 0.0, 'z': -1.0}
MoveBack MoveAhead
shashank@shashank:~/Project$ ./run1.py
{'x': -2.0, 'y': 0.9009992480278015, 'z': -0.5}
0.0 0.0 -1.0 -1.25
MoveBack MoveAhead MoveRight MoveLeft
shashank@shashank-VirtualBox:~/Project$ python3 run1.py
```

run1.py



Sidetrack – navigation using Computer Vision



Future tasks

- ▶ Reducing the time taken to calculate and map the grid
- ▶ Getting the exact view once the agent reaches the desired location