

Report

RBE 550 Assignment 4: WildFire

General Information:

The environment is visualised using Matplotlib, the truck represented by a rectangle with the obstacles being tetrominoes

For calculations, the environment is represented by a 2D numpy array.

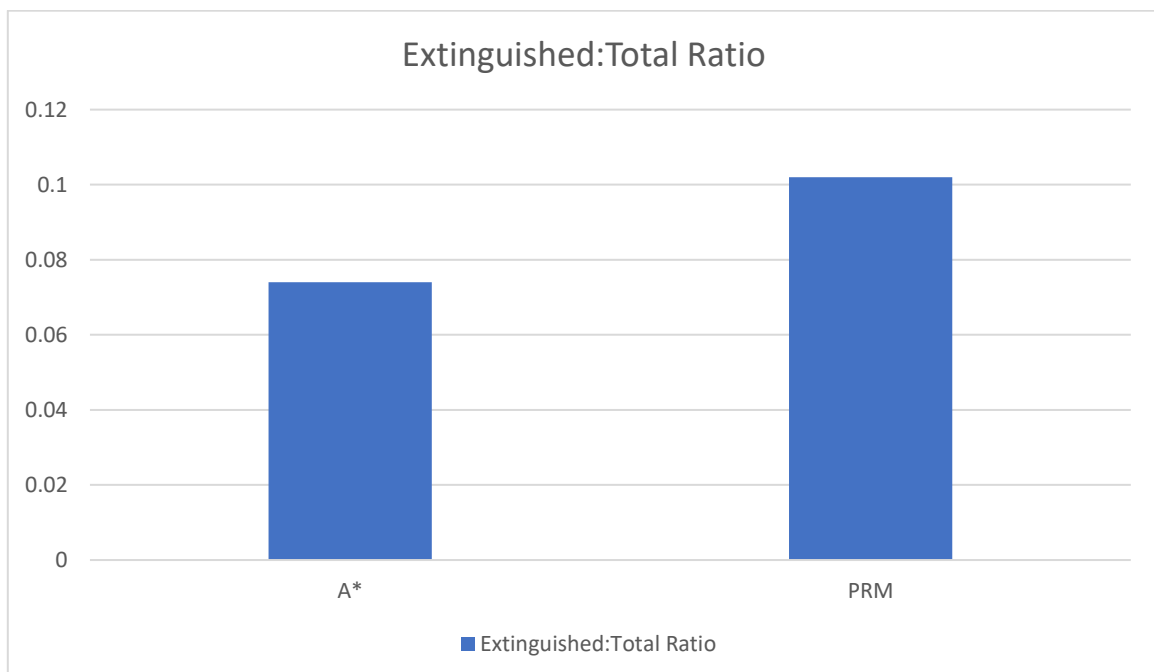
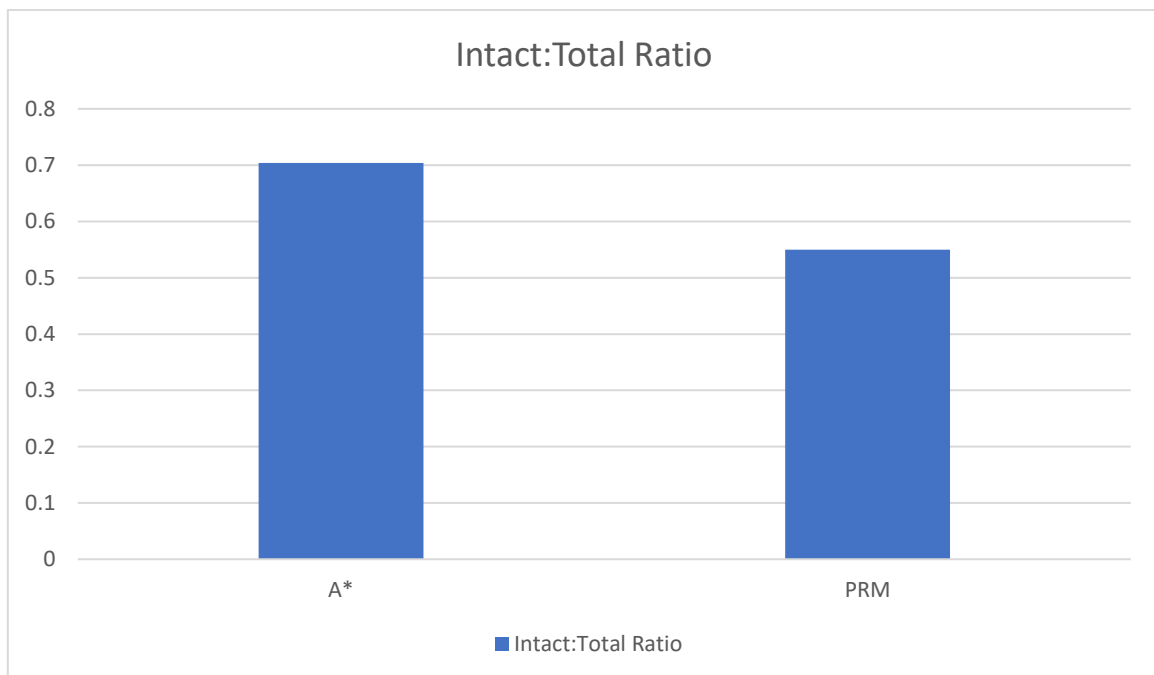
The rules for setting and extinguishing fire are as described in the assignment.

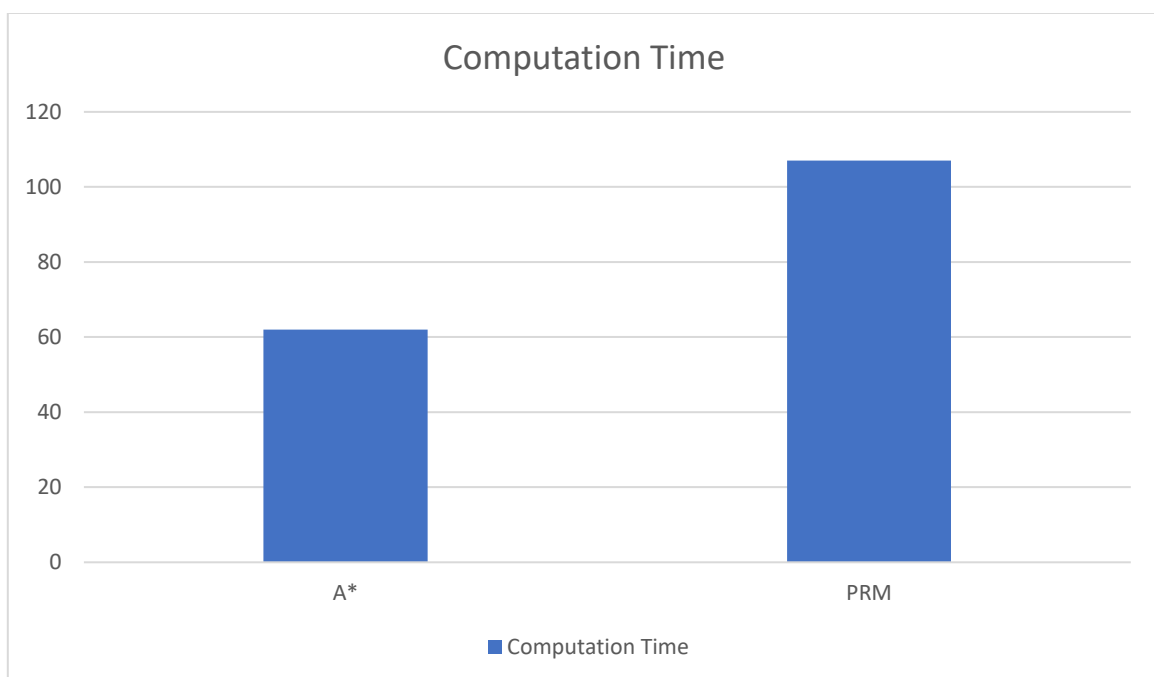
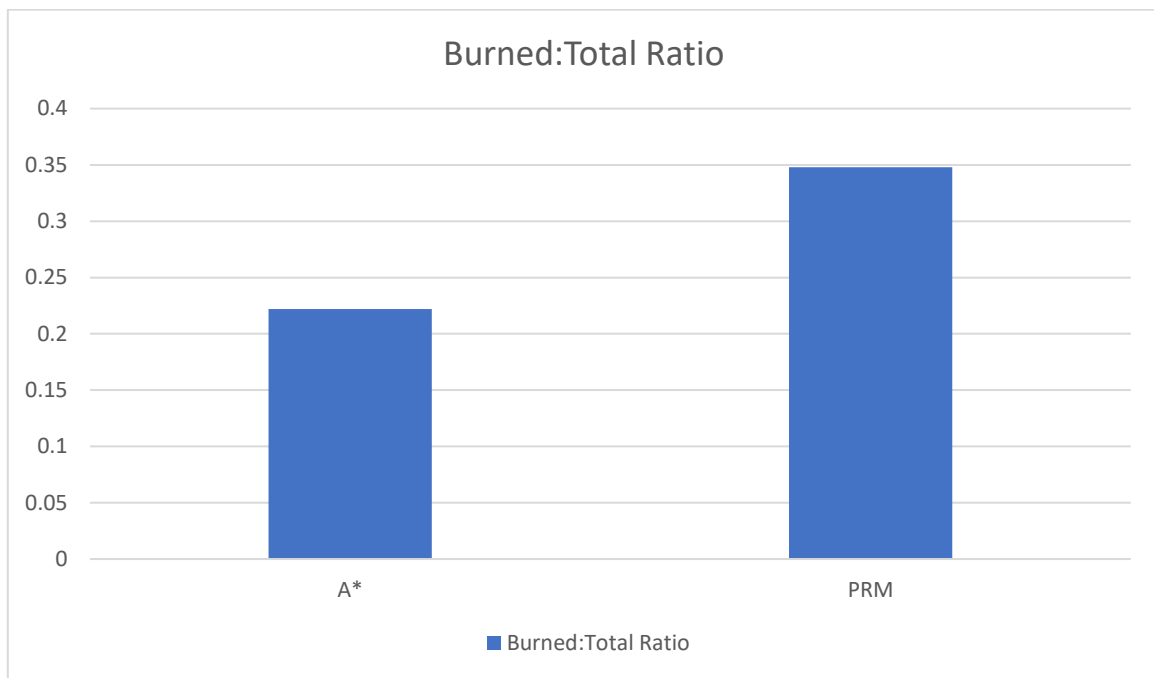
The algorithms used are PRM and A*. For local planning, hybrid A* is used to ensure kinematically consistent trajectories for the firetruck.

Obstacles on fire are red and are otherwise blue.

Graphs:

These values are averaged over 5 runs of the simulation.





Conclusions:

- 1) From the video and charts it can be seen that while PRM performs better when it comes to extinguishing burning obstacles, it may be because it takes longer to get to its target allowing for more objects to be lit. This may be because a low sampling rate that increases performance is also causing it to take less optimal paths as can be seen at roughly the 15 sec mark of the PRM Video uploaded with this submission
- 2) In terms of computational resources, PRM is significantly higher even though, as a sampling based method it should require fewer computations. Maybe the implementation of PRM in the code is inefficient or possibly, the number of sampled points is too high. Another possibility is that the firetruck is really fast which makes it so that the advantage gained by calculating the roadmap a priori is lost since it is not used sufficiently many times, ending up with an extra computation for the nodes and its connections compared to A*