

COMP3888 - phase 2

September 2020

1 Description

This document describes a simple step of considering battery life will be added into the main algorithm.

2 Assumptions

- Battery status does not impact the performance of drone
- Battery life will thus be converted into/provided as a distance that the drone can travel
- The charging time will not be taken into consideration at this stage.
- The starting point as well as destination of a drone is not a charging station

3 Steps

Before performing Dijkstra's, drone battery will be taken into consideration. After constructing the graph, all edges that exceed the maximum range of the drone with current battery life will be stripped. Primary cases are:

- Locations that cannot reach by starting battery
- Paths that exceed the maximum reasonable length
- Reserve battery for the drone to fly to at least one charging point

4 Pseudocode

```

1 # find the closest charging station to destination
2 reserve = find_closest(edges_to_destination)
3
4 # reserve power by adding edge weight
5 for edge in edges_to_destination:
6     edge.length += reserve
7
8 # remove edges that cannot reach with start battery
9 for edge in source_edges:
10
11     if edge.length > current_battery:
12         edges.remove(edge)
13
14 # remove edges that are longer than maximum range
15 for edge in edges:
16
17     if edge.length > maximum_battery:
18         edges.remove(edge)

```

5 Complexity

Iterating through all edges and assuming data structure of list can perform remove in $O(1)$

$$O(n^2)$$