ROS Case Study#5

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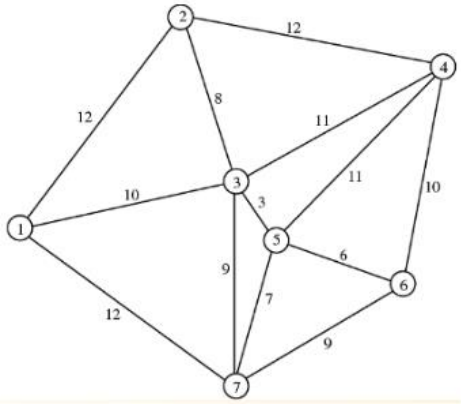
This study solves a travelling salesman problem for robot high-level planning.



The study is trying to find the lowest cost/ the shortest path in the above schematic diagram. In the diagram, each node has several paths connecting to other nodes, and the distance (cost) of each path is labeled aside, we are trying to find a sequence of these nodes that has lowest cost in sum.

We implement the study in the Excel. The nodes and paths are presented in an Excel form shown as below.

Data								
		1	2	3	4	5	6	7
	1	999	5	9	999	999	999	11
	2	8	999	9	11	999	999	999
	3	6	7	999	13	5	999	7
	4	999	6	9	999	13	11	999
	5	999	999	4	9	999	12	9
	6	999	999	999	12	9	999	8
	7	11	999	7	999	8	12	999
Decision Variable		2	4	6	7	5	3	1	2
	cost	11	11	8	8	4	6	5	
Objective Function		53						

Then we list the cost from one node to another in the “Decision Variable” row. To optimize the cost, we use a solver in the Excel, adding constraint to ensure the node numbers are all different, then find a sequence that has lowest cost.

For details, you can check the Excel file.