Deliverable 4

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2016-11-17 6:20

I pledge my honor that I have neither given nor received aid on this work.

1

The items that have been achieved:

- Some bug fix and code refinements for the simulation program (the target tracking problem).
- Empirical verifications (in progress).

2

To reveal the relation between the uncertainty level and the probability that a sensor fail to reach the target (based on the experiment results), we choose following independent variables for the experiments:

- the number of sensors
- the commutation distance
- the value of sigma (in Gaussian distribution which is the representation of the uncertainty level in the model)
- discount factors
- the velocity range of sensors
- the connectivity of the underlying graph of the dynamic network(optional, calculating the connectivity is slow)

For each configuration, multiple experiments with random initial state will be tested and the outcome is the ratio of the number of lost sensors to the total number of sensors.

3

Experiments run slowly. It will take sometime to finish all of the experiments.

4

- a) By adding multiple targets and assuming the order of some targets, the distributed planning may be incorporated into the current problem model so that sensors should track targets following the order without centralized controls.

- b) The advantage is that the model will become more flexible to describe more complicated real world problems.

- c) The disadvantage is that the model will be beyond the definition of consensus problem, which means we cannot reuse the current algorithm to solve it.

- d) Using a set of targets instead of using a single target and assuming there is a topology sort on the target set. Further assuming that one target is not avaiable when its pre-requires are not reached.