Introduction to Robotics: Homework 4 Auto Test

According to the feedbacks, we made the following modifications:

- We change some parameters in `SensorModel.py`
- We provide some examples as well as a auto-test program to help you locate the bug.
- Some tricks on how to speed-up the running.

The auto-test program:

To use the autotest program, you need to unzip the `autotest.zip` file we provided. Then, follow the steps below.

Usage

To use the autotest program, you need to unzip the `autotest.zip` file we provided. Then, follow the steps below.

STEP 1: copy your implemented `MotionModel.py`, `Resampling.py` and `SensorModel.py` to `.../autotest/scripts/`.

STEP 2: change your directory to `.../autotest/scripts/`.

STEP 3: run `python autograde.py` and see the gradings for each task.

STEP 4: your failed samples will be stored in `.../autotest/failures/`. If you want to test again, please **DELETE ALL THE SAMPLES** in folder `.../autotest/failures/motiondata/`, `.../autotest/failures/resampledata/` and `.../autotest/failures/sensordata/`. Please do not delete the three folders mentioned.

Grading

The grading in `autograde.py` is just a reference for you to debug your implementation. We are using only a portion of the samples we are going to use in our final grading and therefore, passing all the test points in the autograder does not necessarily mean that you will get full credit. Moreover, not getting full credit in the autograder does not mean that you will get a low grade in this homework. We will carefully check your implementation and give a score based on your understanding of the algorithms shown by your code.

How to speed up training:

1. Do not use `norm.cdf`. You can use the `math.erf` and implement the CDF function by yourself.
2. In fact, there's no need to use all the data in the log. Only using a subset of them will accelerate the training to a great extent. In the auto-test program, we fix the down sample rate to be `10`. Namely, we use the `1, 11, 21,...` piece of data in the laser record (rather than `1,2,3,...,180`). The training will complete in about 20 minutes.
3. We will also provide a video in the WeChat group to show the whole trajectory and you can refer to it.