Particle Filter Mini-Assignment

In this assignment, you will program a particle filter algorithm on a two-wheeled robot. Robot's motion is described by r1, r2 and t, which are left wheel rotation, right wheel rotation and forward translation, respectively. The robot is equipped with sensors to sense its range from each specific landmark.

We have provided the code skeleton. A visualization of the particle filter state is also provided by the framework. You should only modify particle_filter.py. **Do not modify code in files other than particle_filter.py.** Otherwise the auto-grader may be unable to run your code and/or may decide that your outputs are incorrect.

In particle_filter.py

1. A completed function of ***sample_motion_model()*** is provided. This function samples new particle positions based on the old positions and the robot's motion.

2. Complete the function ***eval_sensor_model()***. This function implements the measurement update step of a particle filter, using a range-only sensor. It takes as input landmarks positions and landmark observations. It returns a list of weights for the particle set.

3. Complete the function ***resample_particles()***. The function takes as an input a set of particles and the corresponding weights, and returns a sampled set of particles.

The code will only work properly after you have completed all the functions above.

Observe how the parameters (e.g. number of particles, number and position of landmarks, measurement and motion noises) affect the convergence of localization error.

Submissions

- ***<your metric number>_pf.py*** - Your particle_filter.py python code
- ***<your metric number>_pf.pdf*** - Short report describing the programming assignment and your solution.