Unit 12 - Week 10

Assignment 10

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-11-25, 23:59 IST.

1) Which of the following algorithms make the Markov assumption about the system dynamics ? *1 point*

- [ ] Kalman Filter
- [ ] Extended Kalman Filter
- [ ] Particle Filter
- [ ] Binary Bayes Filter with static state

No, the answer is incorrect.
Score: 0
Accepted Answers:
Kalman Filter
Extended Kalman Filter
Particle Filter
Binary Bayes Filter with static state

2) Assertion: The Kalman Filter update results in a Gaussian belief state representation *1 point*
Reason: The Kalman Filter assumes Markov dynamics

- ( ) Both Assertion and Reason are true, and Reason is correct explanation for Assertion
- ( ) Both Assertion and Reason are true, but Reason is not correct explanation for assertion
- ( ) Assertion is true and Reason is false
- ( ) Both Assertion and Reason are false

No, the answer is incorrect.
Score: 0
Accepted Answers:
Both Assertion and Reason are true, but Reason is not correct explanation for assertion

3) Assume that the robot is moving a circular trajectory. Which of the following are appropriate choices for state estimation? *1 point*

- [ ] Kalman Filter
- [ ] Extended Kalman Filter
- [ ] Particle Filter
- [ ] None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
Extended Kalman Filter
Particle Filter

4) Assume the following dynamics for a 1-dimensional system: *3 points*

$$x_t = x_{t-1} + u_t + \epsilon$$
$$z_t = x_t + \eta$$

Both ϵ and η are zero mean Gaussian random variables, with 0.1 variance. Given that the initial belief is a Gaussian with zero mean and unit variance, u_1 is +0.1 and z_1 is +0.11. Which of the following is closest to the new belief state, after a Kalman Filter update ?

- ( ) A Gaussian with zero mean and unit variance
- ( ) A Gaussian with mean 0.1 and variance 0.1
- ( ) A Gaussian with mean 0.1 and variance 0.01
- ( ) A Gaussian with mean 0.05 and variance 0.1
- ( ) A Gaussian with zero mean and variance 0.05
- ( ) A Gaussian with mean 0.05 and unit variance
- ( ) A Gaussian with mean 0.06 and variance 0.1
- ( ) A Gaussian with mean 0.06 and variance 0.08

No, the answer is incorrect.
Score: 0
Accepted Answers:
A Gaussian with mean 0.1 and variance 0.1

5) Consider the following two statements: *1 point*

Statement 1: The importance weight used in a particle filter accounts for the observation probabilities

Statement 2: The importance weight used in a particle filter accounts for the noise in the state transition model

Which of the following are **true**?

- ( ) Both Statement 1 and Statement 2 are true
- ( ) Statement 1 is true and Statement 2 is false
- ( ) Statement 1 is false and Statement 2 is true
- ( ) Both Statement 1 and Statement 2 are false

No, the answer is incorrect.
Score: 0
Accepted Answers:
Statement 1 is true and Statement 2 is false

6) Particle Deprivation can be overcome by which of the following? *1 point*

- ( ) Reinitializing particles
- ( ) Not performing resampling
- ( ) Increasing the number of particles
- ( ) Adding noise to the observation model

No, the answer is incorrect.
Score: 0
Accepted Answers:
Reinitializing particles