Markov Chain Monte Carlo

测验, 10 个问题

✖ 准备好后再次尝试。

通过所需分数：80% 或更高

每隔 8 小时，您最多可以重新进行 3 次 此测验。

返回到第 4 周

重新测试

0.25 / 1
分

1。

Select correct statements

- [ ] One can obtain multivariate gaussian sample $x \in \mathbb{R}^n$ from n standard 1d gaussian samples

这应该被选择

- [x] One can obtain n multivariate gaussian samples $x \in \mathbb{R}^n$ from n standard 1d gaussian samples.

这个选项的答案不正确

Wrong: we need n^2 1d gaussian samples to do that.

- [ ] One can obtain sample from exponential distribution using one sample from uniform

这应该被选择

- [ ] One can obtain sample from gaussian distribution using one sample from uniform

未选择的是正确的

✖ 0 / 1 分

2。

What is a time complexity of an algorithm for sampling a random number from an arbitrary discrete distribution with support $\{1, \ldots, N\}$

- ○ O(N log N)
- ● O(1)

这个选项的答案不正确

Wrong: prior to sampling we need to compute cumulative sums which is O(N) operations.

- O(log N)
- O(N)

0.75 / 1
分

3。
What we can use Monte-Carlo method for?

- [x] Compute an integral of an arbitrary function over a simple area (e.g. a multidimensonal cube)

正确
Correct: just sample random points uniformly in the area and average the function values in those points. Note that usually this is not the best approach, although very scalable.

- [ ] Compute the exact mode of a posterior distribution (MAP-estimation)

未选择的是正确的

- [ ] Do full bayesian inference to estimate the uncertainty of you model.

这应该被选择

- [x] Estimate the expected values of arbitrary random variables

正确
Correct: this is what Monte-Carlo method is for.

0.60 / 1
分

4。
Which of the statements below are correct?

- [ ] Any Markov chain is a sequence of discrete random variables, for example: $\{0, 1, 0, 0, 1, 0, 0, \dots\}$.

未选择的是正确的

- [x] Any sequence of random variables $X_n : n \in \mathbb{N}$ can be considered as a Markov chain.

这个选项的答案不正确
Wrong: the sequence must satisfy the Markov property
$p(X_n|X_{n-1},\dots,X_1) = p(X_n|X_{n-1})$

All elements X_n of a Markov chain $X_n : n \in \mathbb{N}$ are independent random variables.

未选择的是正确的

Any Markov chain converges to a stationary distribution

未选择的是正确的

Markov chain does not "remember" states other than current

这应该被选择

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0 / 1 分

5。
Which of the statements below are correct?

MCMC techniques are used when ones cannot perform bayesian inference analytically

正确
Correct.

MCMC provides i.i.d. samples from desired distribution

这个选项的答案不正确
Wrong: samples are correlated because they are supplied from a Markov Chain. To eliminate this effect one can skip consecutive elements from the chain (for example considering only each 10-th point)

MCMC can be used to sample from the distribution known up to a normalization constant

这应该被选择

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1 / 1 分

6。
Which of the statements below are correct?

Each iteration of Gibbs sampling changes only one coordinate of a latent vector

正确
Correct

Gibbs sampling is a special case of a Metropolis-Hastings algorithm.

正确
Correct. Gibbs sampling is a special case of MH with acceptance rate equal to 1.

Gibbs sampling reduces multidimensional sampling to one-dimensional sampling.

正确
Correct.

Gibbs sampling converges really fast because it provides very uncorrelated samples compared to Metropolis-Hastings algorithm

未选择的是正确的

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0 / 1 分

7。
Which of the following is random in Bayesian Neural Networks?

Weights of the network w

正确
Correct

Prediction of the network y given fixed input x

这应该被选择

Number of units on each layer of the network

未选择的是正确的

Number of active layers of the network

未选择的是正确的

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1 / 1 分

8。

What is a good way to train (find the posterior distribution $p(w|D)$) Bayesian Neural Network?

- [ ] Compute the posterior distribution $p(w|D)$ analytically.

- [x] Run the stochastic gradient descent perturbing all network weights with independent Gaussian noise after each iteration.

正确
Correct. This algorithm is called Langevin Monte Carlo and is proved to converge to the true posterior.

- [ ] Iteratively sample each weight from the conditional distribution given all other weights and the data.

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0 / 1 分

9。
What does the word “Collapsed” means in the Collapsed Gibbs Sampling algorithm?

- [x] It means that the posterior approximation *collapses* to the are posterior distribution.

这个选项的答案不正确
Wrong

- [ ] It means that posterior distribution over some of the variables is computed analytically, while other variables are sampled using Gibbs Sampling.

- [ ] It means that we train the model on the subsample of the original data.

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0 / 1 分

10。
Which of the variables are randomly sampled in Collapsed Gibbs Sampling for LDA?

- [ ] Z

- [ ] Φ, Θ

- [x] Φ, Θ, Z

这个选项的答案不正确
Wrong

- [ ] Φ

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