



Can log likelihood function be positive [duplicate]

Asked 3 years, 11 months ago Active 3 years, 11 months ago Viewed 4k times



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Closed 3 years ago.

I have a mixture data. I used EM to estimate the model parameters. When I calculate the log likelihood function, I found that the values is positive. So, is that ok. Can the log likelihood function be positive?

To be more clear:

$$ll = \sum_{n=1}^N \log(\sum_{k=1}^K \pi_k f(x_n; \theta_k))$$

expectation-maximization

mixture-distribution

likelihood

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edited Dec 21 '17 at 11:54

asked Dec 21 '17 at 10:22



Alice

225

2

18



To my understanding, likelihood function is usually a product of probabilities and log-likelihood is a sum of logs. Because probabilities are less than 1, their logs should be less than 0. And because you sum those logs, you should get a negative number. – [Celdor](#) Dec 21 '17 at 10:32

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The comment above is wrong. The likelihood function of continuous parameters (such as your case, I guess) is based on probability *densities*, which can be greater than 1 depending on the domain and the density, so the log likelihood can occasionally be positive. Still, you should check that everything else is correct. – [lacerbi](#) Dec 21 '17 at 10:35



yes, my density is continuous. ' – [Alice](#) Dec 21 '17 at 10:37

1 Answer

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Simply (*just summarizing the comments*):

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- when using probabilities (**discrete** outcome), the log likelihood is the sum of logs of probabilities all smaller than 1, thus it is always negative
- when using probability densities (**continuous** outcome), the log likelihood is the sum of



logs or densities that can be greater than 1, thus it can be positive.



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answered Dec 21 '17 at 11:07



Benoit Sanchez

7,247 20 43



If all the discrete probability is in a single outcome, log-likelihood would be 0 rather than negative.

– Glen_b Sep 3 '20 at 5:41