

Can log likelihood funcion be positive [duplicate]

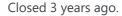
Asked 3 years, 11 months ago Active 3 years, 11 months ago Viewed 4k times



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Can a probability distribution value exceeding 1 be OK? (6 answers)





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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





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, theirs 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 🖍



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 of densities that can be greater than 1, thus is can be positive.



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answered Dec 21 '17 at 11:07





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

