likelihood forms a fundamental link between models and data in the Bayesian framework.

ML is a widely used alternative to Bayesian methods and it will be useful to understand their similarities and differences. It turns out they are actually pretty similar.

slide 4

Let's touchback to the problem from probability lab concerning deer. What is fixed here the data or the parameters?

Here we are calculating the probability of y conditional on the model where theta = .12

This example might seem entirely backwards to you, since we know the value of the parameter.

slide 5

what we are usually confronted with instead are cases where we have a fixed set of data and we want to know what the observations tell us about the parameters.

This is some foreshadowing: Bayesian statistics is the method for answering this question.

slide 6

This is because Bayesian statistics is the only method that will result in a true probability distribution for a parameter.

slide 7

in contract inference in likelihood is all relative, as we will compare one value of a parameter to another using their relative probabilities or probability densities.

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Bayesian refer to the PDF or PMF on the right-hand side as a likelihood or data model to differentiate it from other types of distributions in Bayesian analysis, so don't let this confuse you

slide 16

evidence is obtained using a likelihood ratio of two values, interpreted as the degree to which the data support one value over another and the natural log of this is defined as the support for one value over another

which value has the most support? MLE

slide 19

key difference between probability distribution and a likelihood function is that the parameters are fixed and the data are random variables in a PDF/PMF and in a likelihood function the data are fixed and the parameters are variable.

the units on the y-axis of the likelihood profile are arbitrary and can be scaled to any value, typically they are scaled to 1.

QUESTION: Since theta on the right is variable does that mean it is a random variable? No because random variables are defined as quantities governed by probability distributions, and likelihood functions do not define the probability or probability density of theta.