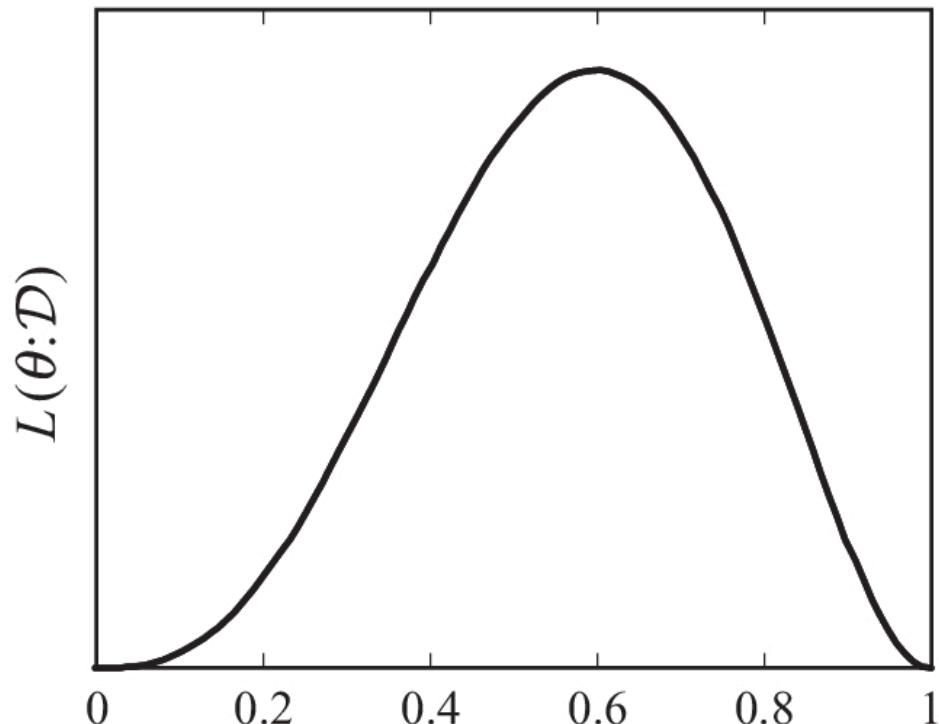


Information

Parameter Learning

Consider the example of parameter learning for our thumbtack, from the lecture slides, where we had the following likelihood function, based on $N = 5$ observations, of which $k = 3$ were heads, and $(N - k) = 2$ were tails:

**Information**

If instead of $N = 5$ we had ten times as many observations ($N = 50$), with $k = 30$ heads, which of the following statements (if any) are correct?

Frage 18

Richtig

Erreichte Punkte 1,00 von 1,00

The likelihood function would keep its maximum at the same place, but become flatter / broader.

- Wahr
- Falsch ✓

Die richtige Antwort ist 'Falsch'.

Frage 19

Richtig

Erreichte Punkte 1,00 von 1,00

The function value at the maximum would be 10 times as high.

 Wahr Falsch ✓

Die richtige Antwort ist 'Falsch'.

Frage 20

Richtig

Erreichte Punkte 1,00 von 1,00

The likelihood function would now range (on the horizontal axis) from 0 to 10.

 Wahr Falsch ✓

Die richtige Antwort ist 'Falsch'.

Frage 21

Richtig

Erreichte Punkte 1,00 von 1,00

The maximum of the likelihood would shift to the left, towards the center value 0.5.

 Wahr Falsch ✓

Die richtige Antwort ist 'Falsch'.

Information

Back to the original example with $N = 5$. Now assume we perform **Bayesian** parameter estimation. We believe that thumbtacks behave like fair coins, which we model with a symmetric prior that has its maximum at $\theta = 0.5$.

Frage 22

Richtig

Erreichte Punkte 1,00 von 1,00

Will the resulting MAP estimate $\hat{\theta}_{\text{MAP}}$ be ...

Wählen Sie eine Antwort:

- a. larger than $\hat{\theta}_{\text{ML}}$
- b. the same as $\hat{\theta}_{\text{ML}}$
- c. exactly at 0.5
- d. smaller than $\hat{\theta}_{\text{ML}}$ ✓

Die richtige Antwort ist: smaller than $\hat{\theta}_{\text{ML}}$

Frage 23

Richtig

Erreichte Punkte 1,00 von 1,00

If we now again increase the training data to ten times as many observations ($N = 50$), with the same empirical distribution (30 heads, 20 tails), will the resulting MAP estimate ...

Wählen Sie eine Antwort:

- a. move farther away from $\hat{\theta}_{\text{ML}}$
- b. stay the same, but with a higher probability
- c. move closer to $\hat{\theta}_{\text{ML}}$ ✓

Die richtige Antwort ist: move closer to $\hat{\theta}_{\text{ML}}$