Week 1 Lab

Quiz, 6 questions

6/6 points (100%)

Congratulations! You passed!

Next Item

1 / 1 point

1.
Based on the preceding result, what is the probability that Machine 1 is “Bad” given you won playing on Machine 1?

- 0.3
- 0.4

Correct
Correct. Event M_1 is bad given we have a win on M_1 is the complement of the event M_1 is good given we have a win on M_1. By the property of probability, $P(M_1 \text{ is bad} \mid \text{Win on } M_1) = 1 - P(M_1 \text{ is good} \mid \text{Win on } M_1)$

- 0.5
- 0.6
- 0.7

1 / 1 point

2.
Based on the preceding result, what is the probability that Machine 2 is “Good” given you won playing on Machine 1?

- 0.3
- 0.4

Correct
Correct. The event M_2 is good given we have a win on M_1 is the same event as M_1 is bad given we have a win on M_1. Therefore, the event M_2 is good is the complementary event of M_1 is good, given we have a win on M_1. We have

$$P(M_2 \text{ is good} \mid \text{Win on } M_1) = 1 - P(M_1 \text{is good} \mid \text{Win on } M_1)$$

- 0.5
- 0.6
- 0.7

1 / 1 point

3.
Under the Bayesian paradigm, which of the following correctly matches the probabilities with their names?

- Posterior - $P(M_1 \text{ is Good} \mid \text{Win on } M_1)$

  Prior - $P(M_1 \text{ is Good})$

Likelihood - $P(\text{Win on } M_1 \mid M_1 \text{ is Good})$

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Correct
Correct. The Prior Probability is the probability of our hypothesis: M_1 is good, a number that reflects what we believe the chance for M_1 to be the good machine. The Posterior Probability is the updated probability of our hypothesis after we have observed the data. In the contrast, the Likelihood is the probability that the data happens given the Prior.

- Posterior: $P(M_1 \text{ is Good} \mid \text{Win on } M_1)$

  Prior: $P(\text{Win on } M_1 \mid M_1 \text{ is Good})$

  Likelihood: $P(M_1 \text{ is Good})$

- Posterior: $P(\text{Win on } M_1 \mid M_1 \text{ is Good})$

  Prior: $P(M_1 \text{ is Good} \mid \text{Win on } M_1)$

  Likelihood: $P(M_1 \text{ is Good})$

- Posterior: $P(\text{Win on } M_1 \mid M_1 \text{ is Good})$

  Prior: $P(M_1 \text{ is Good})$

  Likelihood: $P(M_1 \text{ is Good} \mid \text{Win on } M_1)$

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1 / 1
point

4.
Use the **bandit_posterior** function to calculate the posterior probabilities of Machine 1 and 2 being "good" after playing Machine 1 twice and winning both times, and then playing Machine 2 three times with 2 wins then 1 loss.

- $P(M_1 \text{ is good} \mid \text{data}) = 0.250$, $P(M_2 \text{ is good} \mid \text{data}) = 0.750$
- $P(M_1 \text{ is good} \mid \text{data}) = 0.429$, $P(M_2 \text{ is good} \mid \text{data}) = 0.571$
- $P(M_1 \text{ is good} \mid \text{data}) = 0.571$, $P(M_2 \text{ is good} \mid \text{data}) = 0.429$

Correct
Correct.

- $P(M_1 \text{ is good} \mid \text{data}) = 0.750$, $P(M_2 \text{ is good} \mid \text{data}) = 0.250$

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1 / 1
point

5.
What would the posterior probabilities be if we had instead played Machine 2 first, playing three times with 2 wins and 1 loss, and then playing Machine 1 twice and winning both times?

- $P(M_1 \text{ is good} \mid \text{data}) = 0.250$, $P(M_2 \text{ is good} \mid \text{data}) = 0.750$
- $P(M_1 \text{ is good} \mid \text{data}) = 0.429$, $P(M_2 \text{ is good} \mid \text{data}) = 0.571$
- $P(M_1 \text{ is good} \mid \text{data}) = 0.571$, $P(M_2 \text{ is good} \mid \text{data}) = 0.429$

Correct
Correct. Changing the order or the plays will not affect the posterior probability. Because our "belief" will eventually get updated according the all the data we have after two plays. It does not matter which play happens first.

- $P(M_1 \text{ is good} \mid \text{data}) = 0.750$, $P(M_2 \text{ is good} \mid \text{data}) = 0.250$

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6.
From the plot generated in the example above, we can see that the posterior probabilities for Machine 1 and Machine 2 mirror each other. Why will this happen?

- $P(M_1 \mid \text{data})$ and $P(M_2 \mid \text{data})$ are complementary
- Machine 1 and Machine 2 being "good" are mutually exclusive events
- Both of the above

Correct
Correct.