

1. How do you control for biases?

Biases can be controlled in many ways. The bias/variance tradeoff should always be considered. As you overfit your model (use too many parameters) you contribute to bias. Limiting the number of parameters decreases bias.

2. What are confounding variables?

Confounding variables either are uncorrelated or spuriously correlated with your desired model outcome.

3. What is A/B testing?

A/B testing basically compares changes based on output. You run your model in two different configurations (A and B) and choose the better one. This is used all over software development.

4. When will you use Welch t-test?

When you have unpaired samples (different sample sizes and variances)

5. A company claims that the average time its customer service representatives spend on the phone per call is 6 minutes. You believe that the average time is actually higher. You collect a random sample of 50 calls and find that the average time spent on the phone per call in your sample is 6.5 minutes, with a standard deviation of 1.2 minutes. Test whether there is sufficient evidence to support your claim at a significance level of 0.05.

There is not because 6 min is within one standard deviation.

6. A researcher wants to determine whether there is a difference in the mean scores of two groups of students on a math test. Group A consists of 25 students who received traditional teaching methods, while Group B consists of 30 students who received a new teaching method. The average score for Group A is 75, with a standard deviation of 8, and the average score for Group B is 78, with a standard deviation of 7. Test whether there is a significant difference in the mean scores of the two groups at a significance level of 0.05.

There is not a significant difference, $t = -7.575$, $v = 11.486$, significance level is greater than 99%