4. Confidence Interval Concept Checks Continued

Confidence Interval Concepts Review Continued

Start of transcript. Skip to the end.

So here's a new experiment in which
there are 150 participants.
So basically, think of your 124.

Now, it's 150.
It turns out that exactly half of them
turn their head to the left and half of them
turn their head to the right.
And now, I'm giving you a bunch of candidates
for confidence intervals.

0:00 / 0:00 1.50x

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Confidence Interval Concept Check 4

1/1 point (graded)
If $[0.34, 0.57]$ is a **realization** of a (non-asymptotic, for some fixed n) 95% confidence interval for an unknown parameter p, then which of the following is true?

The probability that the unknown parameter p is in this interval is

- ≥ 0.025

- ≥ 0.05
- ≥ 0.95
- None of the above, because p and $[0.34, 0.57]$ are both deterministic.

Solution:

Given some unknown but fixed parameter $\theta \in \mathbb{R}$ for a parametric model and random variables $X_1, \ldots, X_n$ distributed i.i.d. P_θ, recall that the non-asymptotic 95% Confidence Interval of p is an interval $\mathcal{I} = \mathcal{I}(X_1, \ldots, X_n)$ such that $\mathrm{Pr}(\mathcal{I} \ni \theta) \geq 0.95$. It is important to note that there is randomness here, given by the randomness of $\mathcal{I}$.

A realization of a random variable is *deterministic*. The interval $[0.34, 0.57]$ either contains the parameter p, or it doesn't. In other words, the expression $\mathrm{Pr}([0.34, 0.57] \ni p)$ is equal to 1 or 0. Hence, the correct choice is "None of the above, because p and $[0.34, 0.57]$ are both deterministic.".

Submit You have used 1 of 1 attempt

Answers are displayed within the problem

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The answer is wrong. imho.

discussion posted a day ago by m_m_sharapov

The answer is wrong while in fact p supposed to be a stochatic unknown.

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1 response

markweitzman
a day ago

Not in frequentist statistics which is what we are doing now.

Absolutely. p is unknown but not stochastic, we dont work within bayesian approach.

posted a day ago by vvvolkov

If n is large, shall we be able to make the probabilistic statement with frequentist? how is Bayesian credible interval different from frequentist's confidence interval intuitively? In Bayesian p is a variable as opposed to the frequentist's (population) parameter p (which is deterministic) - why should (and should not) one think of p as a variable / parameter intuitively?

So, in frequentist approach all population parameters are fixed and it's the sample statistics that are random, functions of them are used as estimators of the fixed parameters, is that statement correct? And in Bayesian we can directly have probabilistic statements regarding the population variables since they are random, is that statement correct too?

Don't we need to do any computation based on the samples collected from a population in Bayesian (in terms of sampling distribution etc.)? When do the conclusions obtained with Bayesian become drastically different than frequentist (is it only when we have small samples)? Why can't belief propagation (with prior etc.) happen in frequentist approach too (e.g., recursively updating p as and when we get samples of different size)? Which approach is more prone to outliers?

Also, why these two approaches are considered differently, can't they be combined in some way to obtain more accurate conclusions? Sorry if I am asking too many questions, but I don't have a clear intuition for these two viewpoints w.r.t. the above questions.

posted about a minute ago by sandipan_dey

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