Statistical Thinking Comment Policy

Comments are welcomed. Be informed, informative, respectful, and criticize ideas, not people. Please read our Comment Policy before commenting.

Join the discussion…

jhon • 5 years ago

nice

• Reply • Share ›

Frank Harrell • 5 years ago

Thanks Thomas. It's interesting to me how controversial many elements of statistics are. Unlike math, different statisticians have very different opinions about fundamentals because there are very few unique solutions in stats.

• Reply • Share ›

Thomas B • 5 years ago

This has been an interesting, useful exchange, at least for me. Thank you.

• Reply • Share ›

Frank Harrell • 5 years ago

The CV is not a measure of variability. It is a joint measure of the mean and squared-difference-from-the-mean variability. DRR by definition has a lower mean than SRR, and if variability of the two were to

the-mean variability. DBP by definition has a lower mean than SBP, and if variability of the two were to be the same, the CV for SBP would by necessity be lower than the CV for DBP. For reasons stated earlier, I don't use the CV. I want to separate location and spread statistically.

• Reply • Share ›

Thomas B • 5 years ago

I don't mean to be pedantic but there is literature that, in this specific instance wrt DBP and SBP, supports the CV as being 'fully comparable' and, therefore, enabling a direct comparison of variability. E.g., p. 14 of Levy and Lemeshow's book Sampling for Health Professionals (1980 edition). It doesn't sound like the GMD is 'fully comparable' in the same sense.

• Reply • Share ›

Frank Harrell • 5 years ago

Even though I believe Gini mean differences for the two blood pressures are more directly comparable than other measures, I still don't think they are fully comparable.

• Reply • Share ›

Thomas B • 5 years ago

So, just to be clear, the GMDs for DBP and SBP are directly comparable?

• Reply • Share ›

Frank Harrell • 5 years ago

On the contrary I think that Gini's mean difference would be more applicable (though not perfect for) the comparison of variability of DBP and SBP. The CV might make one conclude that DBP was more variable just because it had a lower mean.

• Reply • Share ›

Thomas B • 5 years ago

Good points and agreement on Neyman-Pearson approaches to hypothesis testing. I was using that as a 'straw man' example in an effort to clarify my ignorance and distinguish GMDs from SDs. Anther example could be ANOVA-type contrasts, and so on. But your point about the GMD being 'in data units' was both helpful and interesting. The CV does have value in a comparison, e.g., of systolic and diastolic blood pressure. Since these two metrics are in differing units, direct comparison of their SDs is not meaningful, whereas comparing their CVs would tell you which metric has more variability. To me, your comment suggests that the GMD would not be useful in determining which blood pressure metric has greater dispersion.

• Reply • Share ›

Frank Harrell • 5 years ago

I'm not sure how something that is unitless and depends on the mean not being near zero (CV) can be compared to Gini's mean difference, which is in data units. Personally I don't use the CV because of the strong location away from zero requirement that makes it almost assume the distribution is a log-type distribution. Also, what made you mention hypothesis testing? I don't like hypothesis testing in general, and especially when it comes to measuring variation.

• Reply • Share ›

Thomas B • 5 years ago

One thing that I don't see discussed in the GMD literature is it's utility in hypothesis testing. This is very different from the SD (or SE) and suggests that, as a measure of dispersion for non-normally distributed information, it's closer to the coefficient of variation, a scale invariant measure of dispersion for more normally distributed information.

• Reply • Share ›

Frank Harrell • 5 years ago

I have few worries about an estimator with breakdown point of 1/n (I still use the mean occasionally), and Gini's mean difference is very efficient, easy to interpret, and fast to compute.

• Reply • Share ›

Roy Tamura • 5 years ago

Using David Donoho's finite sample breakdown definition, it is clear that the breakdown point of GiniMD is 1/n. As a single value goes to infinity, the GiniMD will go to infinity. An example of a high breakdown, high efficiency variance estimate is the minimum Hellinger distance estimator of R. Beran.

• Reply • Share ›

Frank Harrell • 5 years ago

Thanks Thomas. An expert, HA David, has written much about Gini's mean difference and its high efficiency with regard to the ordinary SD even if normality holds. So I'm doubtful about the 0 breakdown comment. Gini's index is completely continuous. It does not involve any sample quantiles, just taking the mean of all absolute differences. It may not be as robust as the median of all absolute differences from the median, but the efficiency gain it has over that probably offsets the little bit of non

differences from the median, but the efficiency gain it has over that probably offsets the little bit of non-robustness. I would rely on Gini's mean difference until some reference shows it is inefficient or meaningless in a situation that occurs in practice.

Reply • Share ›

Thomas B • 5 years ago

Fair enough. It appears to me that we're all on a learning curve wrt the uses, advantages and limitations of GiniMD. You are correct that the CV thread does not consider GiniMD in any depth. Making reference to it seemed worthwhile only insofar as there was a hint of skepticism, a possible limitation to the use of the metric in the zero breakdown point. You've stated that you're 'not convinced' that this is correct. I would be interested in any evidence you can provide in support of this belief.

Reply • Share ›

Frank Harrell • 5 years ago

I just read http://web.ipac.caltech.edu... which was indirectly referenced in stackexchange.stats.com (CrossValidated) but oddly this paper did not address Gini's mean difference at all other than acknowledging its existence.

Reply • Share ›

Frank Harrell • 5 years ago

I read the entire CrossValidated page for a second time and still do not see any useful information about Gini's mean difference there.

Thomas B • 5 years ago

With all due respect, I urge you to revert to the CV link for the full discussion and explanation. It may be that you will want to follow up with the specific CV participant who was quoted.

Reply • Share ›

Frank Harrell • 5 years ago

I'm not convinced that Gini's mean difference has a zero breakdown point. It's not like a quantile. But it has so many other good properties I might not be concerned anyway. Can you describe what QnQn and SnSn are?

Reply • Share ›

Paul Brown • 5 years ago

yes. we suggested using the probability index and a forest plot to aid interpretation:
http://circheartfailure.aha...
cheers

Reply • Share ›

Thomas B • 5 years ago

Here's the quote, again, from the first and only response (not a 'comment') to the OPs query, "Answering the second question, I would recommend to use QnQn or SnSn. Both of them have nice properties. Somebody can recommend to use Gini's means difference, but it has 0 breakdown point (but it is somewhat "robust" and also has a lot of good properties)." As noted, the paper discusses the 'concept of breakdown points.'

Reply • Share ›

Thomas B • 5 years ago

This comment has been removed by the author.

Reply • Share ›

Frank Harrell • 5 years ago

I didn't see Gini's mean difference addressed in any of that. Note that if Y is binary with proportion of ones equal to p, Gini's mean difference is nicely equal to 2p(1-p)n/(n-1).

Reply • Share ›

Frank Harrell • 5 years ago

I like that paper. Can be a powerful approach though hard to interpret the results.

Reply • Share ›

Thomas B • 5 years ago

This discussion on CrossValidated mentions GiniMD as being limited by having a '0 breakdown point' (see the first answer to the query... https://stats.stackexchange.... The concept of 'breakdown points' are discussed in this paper by Davies and Gather, The Breakdown Point-examples and counterexamples, (here ... https://www.ine.pt/revstat/....

Reply • Share ›

Paul Brown • 5 years ago

there is a good paper by Sun et al. where the use z-score is used to form a composite of an assortment of variables including binary and time-to-event in phase II trials to enhance power: http://circheartfailure.aha...

but it depends of course on what the purpose is. Paul

 • Reply • Share ›

Related

- Statistical Criticism is Easy; I Need to Remember That Real People are Involved
- Continuous Learning from Data: No Multiplicities from Computing and Using Bayesian Posterior Probabilities as Often as Desired
- Bayesian vs. Frequentist Statements About Treatment Efficacy
- Integrating Audio, Video, and Discussion Boards with Course Notes
- EHRs and RCTs: Outcome Prediction vs. Optimal Treatment Selection