

Accuracy

Mc

May 27, 2014

Introduction

In plots we recast the results of simulations in terms of accuracy. We compute the accuracy of each method (continuous or categorical), for each level of ρ (see below) by computing the the following quantities:

- false positive (FP) runs with with a significant test under a true null hypothesis
- true positive (TP) runs with a significant test under a false null-hypothesis
- true negative (TN) runs with a nonsignificant result under a true null-hypothesis
- false negative (FN) runs with a nonsignificant result under a false null-hypothesis

Plots to be produced:

- Sensitivity for all 4 of the decision possibilities (continuous ignoring categorical, categorical ignoring continuous, both, either), with X axis being rho (Figure 1)
- PPV for the 4 decision possibilities, with X axis being rho (Figure 2)
- Bar chart with the specificity for the 4 decision possibilities
- Bar chart with the NPV (aggregated over rho) for the 4 decision possibilities

Setup

Model

Two continuous latent variables (η and ξ) are created with N cases, sharing a correlation equal to ρ . A measure x of ξ is created with reliability rel , and then is dichotomized accordingly to p $1 - p$ into c . The correlations $r_{pe} = r(\eta, x)$ and $r_{pb} = r(\eta, c)$ are computed, their p-value and significance (at .05) is recorded.

Design

$\rho = (0, .1, .2, .3, .4, .5, .6, .7)$ $rel = (0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9)$

Computation of quantities

- Continuous false positive (FP_C) freq of runs with continuous test $p < .05$ and $\rho = 0$
- Continuous true positive (TP_C) freq of runs with continuous test $p < .05$ and $\rho > 0$
- Continuous true negative (TN_C) freq of runs with continuous test $p \geq .05$ and $\rho = 0$
- false negative (FN_C) freq of runs with continuous test $p \geq .05$ and $\rho > 0$
- PPV is defined as $TP / (TP + FP)$
- NPV is defined as $TN / (TN + FN)$

The same quantities are computed for the categorical indicator (*_S).

Accuracy for continuous indicator

	rho	SENS_C	SPEC_C	PPV	NPV
1	0.1	0.1050000	0.9507143	0.6805556	0.5150929
2	0.2	0.2511429	0.9507143	0.8359486	0.5593847
3	0.3	0.4511429	0.9507143	0.9015130	0.6339907
4	0.4	0.6090000	0.9507143	0.9251302	0.7085818
5	0.5	0.7204286	0.9507143	0.9359688	0.7727589
6	0.6	0.7974286	0.9507143	0.9417918	0.8243528
7	0.7	0.8618571	0.9507143	0.9459078	0.8731304

Accuracy for categorical indicator

	rho	SENS_S	SPEC_S	PPV	NPV
1	0.1	0.08414286	0.9498571	0.6265957	0.5091118
2	0.2	0.17957143	0.9498571	0.7817164	0.5365558
3	0.3	0.33785714	0.9498571	0.8707658	0.5892414
4	0.4	0.47128571	0.9498571	0.9038356	0.6424155
5	0.5	0.61057143	0.9498571	0.9241081	0.7092267
6	0.6	0.70114286	0.9498571	0.9332573	0.7606681
7	0.7	0.77900000	0.9498571	0.9395245	0.8112494

Accuracy for BOTH indicators significant

	rho	SENS_B	SPEC_B	PPV	NPV
1	0.1	0.0500000	0.9808571	0.7231405	0.5079905
2	0.2	0.1385714	0.9808571	0.8786232	0.5324132
3	0.3	0.3018571	0.9808571	0.9403649	0.5841913
4	0.4	0.4474286	0.9808571	0.9589712	0.6396497
5	0.5	0.5874286	0.9808571	0.9684409	0.7039163
6	0.6	0.6822857	0.9808571	0.9727088	0.7553355
7	0.7	0.7641429	0.9808571	0.9755608	0.8061524

Accuracy for EITHER indicators significant

	rho	SENS_E	SPEC_E	PPV	NPV
1	0.1	0.1391429	0.9197143	0.6341146	0.5165276
2	0.2	0.2921429	0.9197143	0.7844265	0.5650838
3	0.3	0.4871429	0.9197143	0.8585096	0.6420024
4	0.4	0.6328571	0.9197143	0.8874199	0.7146980
5	0.5	0.7435714	0.9197143	0.9025490	0.7819750
6	0.6	0.8162857	0.9197143	0.9104525	0.8335060
7	0.7	0.8767143	0.9197143	0.9161069	0.8817970

Figure 1: Sensitivity for all 4 of the decision possibilities (continuous ignoring categorical, categorical ignoring continuous, both, either), with X axis being rho

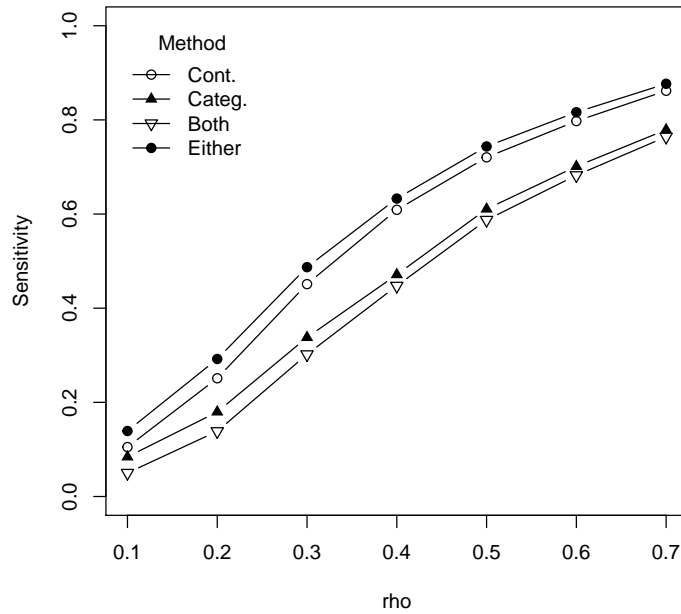


Figure 2: PPV for the 4 decision possibilities, with X axis being rho

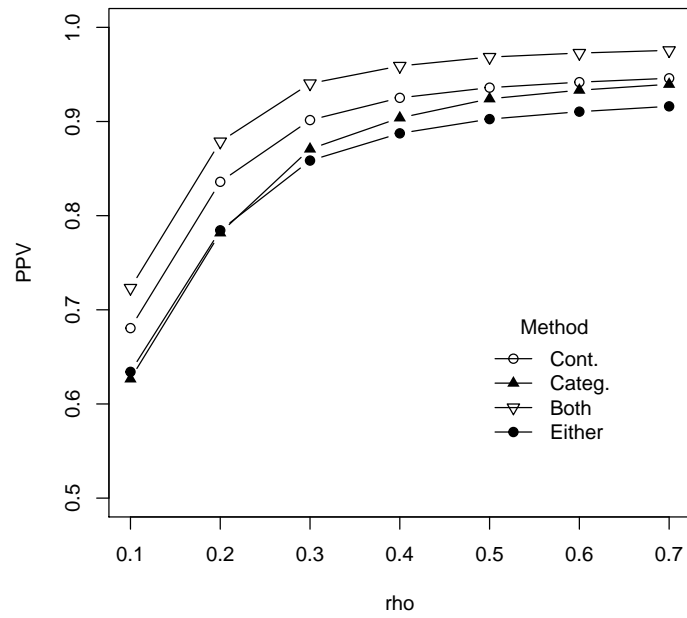


Figure 3: Bar chart with the specificity for the 4 decision possibilities

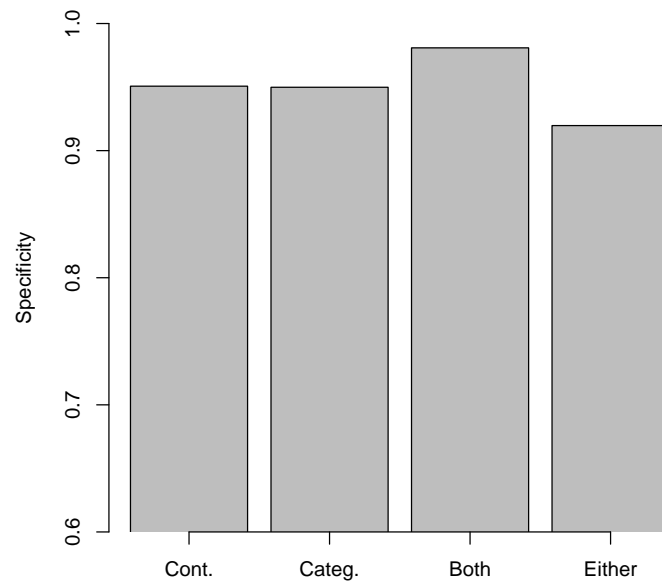


Figure 4: NPV for the 4 decision possibilities, with X axis being rho

