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How to calculate percent improvement of one model over another?

To calculate the percent improvement of one model over another, you first need a metric to measure performance. Common metrics include accuracy, error rate, F1-score, etc., depending on the problem at hand (classification, regression, etc.).

Here's how to calculate the percent improvement:

1. **For metrics where higher is better (like accuracy)**:
$$\text{Percent Improvement} = \left(\frac{\text{New Model's Performance} - \text{Old Model's Performance}}{\text{Old Model's Performance}}\right) \times 100\%$$
2. **For metrics where lower is better (like error rate)**:
$$\text{Percent Improvement} = \left(\frac{\text{Old Model's Performance} - \text{New Model's Performance}}{\text{Old Model's Performance}}\right) \times 100\%$$

Example:

Let's say you're measuring accuracy. The old model has an accuracy of 85%, and the new model has an accuracy of 90%.

Using the first formula:

$$\text{Percent Improvement} = \left(\frac{0.90 - 0.85}{0.85}\right) \times 100\%$$

$$\text{Percent Improvement} = 5.88\%$$

This means the new model is 5.88% better in terms of accuracy compared to the old model.

Always ensure you're comparing models using a consistent dataset or set of datasets (e.g., the same test set) to ensure a fair comparison.

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say if the new model peforms worse than the old model.

If the new model performs worse than the old model, you would still use the same formulas. The resulting percent improvement will simply be negative, indicating a decline in performance.

Let's go through both scenarios using the accuracy metric as an example:

1. **For metrics where higher is better (like accuracy)**:
   If the old model has an accuracy of 90% and the new model's accuracy drops to 85%:
   $$\text{Percent Improvement (or Decline)} = \left(\frac{0.85-0.90}{0.90}\right) \times 100\%$$
   $$\text{Percent Improvement (or Decline)} = -5.56\%$$
   This means the new model's performance has declined by 5.56% compared to the old model.
2. **For metrics where lower is better (like error rate)**:
   If the old model has an error rate of 5% and the new model's error rate rises to 7%:
   $$\text{Percent Improvement (or Decline)} = \left(\frac{0.05-0.07}{0.05}\right) \times 100\%$$
   $$\text{Percent Improvement (or Decline)} = -40\%$$
   This means the new model's performance has declined by 40% in terms of error rate compared to the old model.

Regenerate

Case	Old model	New model	Formula for % Improv
A	0.85	0.90	$\frac{0.9-0.85}{0.85} = 5.88\%$
B	0.90	0.85	$\frac{0.85-0.9}{0.9} = -5.56\%$

In case A, since % Improv sign is +ve we say, ~~new model~~ new model performs 5.88% better compared to old model.

In case B, the new models performance is ~~dec~~ declined by 5.56% compared to old model.

The word "compared to" indicates it comes in denominator & ~~right~~ side of

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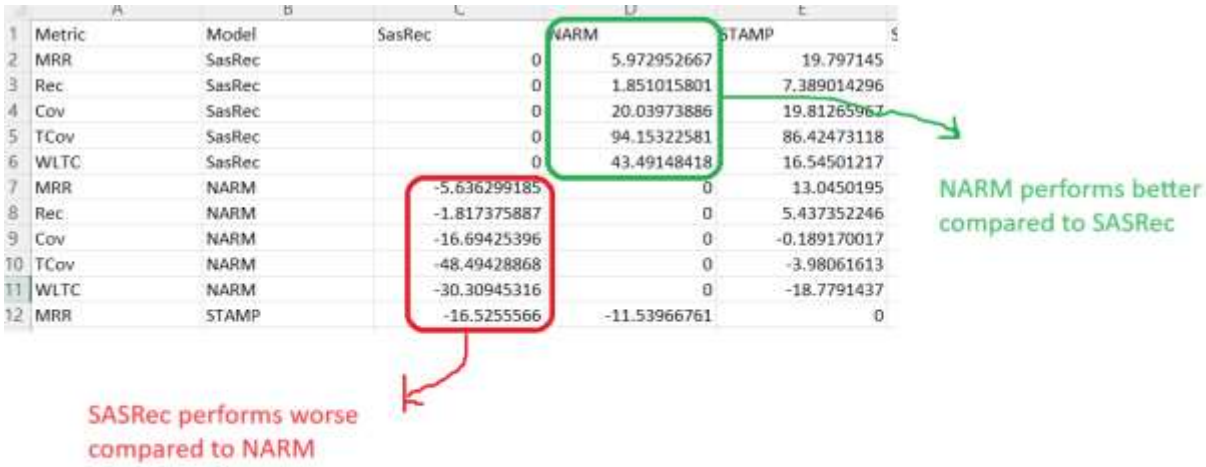
How to read the baseline comparision



	A	B	C	D	E
1	Metric	Model	SasRec	NARM	STAMP
2	MRR	SasRec	0	5.972952667	19.797145
3	Rec	SasRec	0	1.851015801	7.389014296
4	Cov	SasRec	0	20.03973886	19.81265967
5	TCov	SasRec	0	94.15322581	86.42473118
6	WLTC	SasRec	0	43.49148418	16.54501217
7	MRR	NARM	-5.636299185	0	13.0450195
8	Rec	NARM	-1.817375887	0	5.437352246
9	Cov	NARM	-16.69425396	0	-0.189170017
10	TCov	NARM	-48.49428868	0	-3.98061613
11	WLTC	NARM	-30.30945316	0	-18.7791437
12	MRR	STAMP	-16.5255566	-11.53966761	0