Abracadabra

Micro- and Macro-average of Precision, Recall and F-Score

📅 2018-04-27 | 👁

Micro-average Method

In Micro-average method, you sum up the individual true positives, false positives, and false negatives of the system for different sets and the apply them to get the statistics. For example, for a set of data, the system's

True positive (TP1)= 12

False positive (FP1)=9

False negative (FN1)=3

Then precision (P1) and recall (R1) will be 57.14 and 80

and for a different set of data, the system's

True positive (TP2)= 50

False positive (FP2)=23

False negative (FN2)=9

Then precision (P2) and recall (R2) will be 68.49 and 84.75

Now, the average precision and recall of the system using the Micro-average method is

Micro-average of precision = (TP1+TP2)/(TP1+TP2+FP1+FP2) = (12+50)/(12+50+9+23) = 65.96

Micro-average of recall = (TP1+TP2)/(TP1+TP2+FN1+FN2) = (12+50)/(12+50+3+9) = 83.78

The Micro-average F-Score will be simply the harmonic mean of these two figures.

Macro-average Method

The method is straight forward. Just take the average of the precision and recall of the system on different sets. For example, the macro-average precision and recall of the system for the given example is

Macro-average precision = (P1+P2)/2 = (57.14+68.49)/2 = 62.82

Macro-average recall = (R1+R2)/2 = (80+84.75)/2 = 82.25

The Macro-average F-Score will be simply the harmonic mean of these two figures.

Suitability

Macro-average method can be used when you want to know how the system performs overall across the sets of data. You should not come up with any specific decision with this average.

On the other hand, micro-average can be a useful measure when your dataset varies in size.

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