|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ... | **Original Score 1 (n = 974)** | **Original Score 2 (n = 456)** | **Original Score 3 (n = 214)** | **Original Score 4 (n = 199)** | **Original Score 5 (n = 82)** |
| **Predicted Score 1** | + 1.0 | - 2.14 | - 4.55 | - 4.89 | - 11.88 |
| **Predicted Score 2** | - 1.0 | + 2.14 | - 4.55 | - 4.89 | - 11.88 |
| **Predicted Score 3** | - 1.0 | - 2.14 | + 4.55 | - 4.89 | - 11.88 |
| **Predicted Score 4** | - 1.0 | - 2.14 | - 4.55 | + 4.89 | - 11.88 |
| **Predicted Score 5** | - 1.0 | - 2.14 | - 4.55 | - 4.89 | + 11.88 |

**Table, Supplementary Digital Content 7**. Cost Matrix for Utility Ensemble Model Development

*a*Each cell of the cost matrix lists the cost / gain value for when a model predicts a comment’s utility score as “a” (horizontal row) and said comment was originally scored “b” (vertical column).

*b*Cost / gain values were assigned for each column (original score) by dividing the number of comments in the predominant class as scored by the original raters (utility score of 1, n = 974) and dividing it the number of comments originally scored as the class in question; with correct predictions giving a positive gain and misclassifications giving a negative cost. For example, the gain value for the “Predicted Score 2 / Original Score 2” cell of + 2.14 was set by dividing the number of comments originally scored as 1 (n = 974) divided by the number of comments originally scored as number 2 (n = 456). This results in a cost matrix which encourages development of models that correctly predict the minority class instead of simply favoring the majority class, based on the ratio of classes in the original dataset.