The performance of the classifier was evaluated based on sensitivity, specificity, accuracy, and Mathew's Correlation Coefficient (MCC). MCC is a metrics used in machine learning to evaluate the classification performance of binary classification, which is widely used in the field of bioinformatics. This metric took into account four factors: true positive (TP), true negative (TN), false positive (FP), and false negative (FN). It is commonly regarded as a balanced metric, and it can be used even when there is a significant difference in the sample sizes of the two categories. Essentially, MCC is a correlation coefficient that describes the relationship between the actual classification and the predicted classification. Its value was within the range of –1 to 1. A value of 1 implied a perfect prediction of the subject, while a value of 0 suggested that the predicted result was inferior to a random prediction. A value of –1 indicated that the predicted classification was entirely inconsistent with the actual classification. The following formulas were used to calculate these four metrics:

$$\text{Sensitivity} = \frac{\text{TP}}{\text{TP} + \text{FN}}$$

$$\text{Specificity} = \frac{\text{TN}}{\text{TN} + \text{FP}}$$

$$\text{Accuracy} = \frac{\text{TP} + \text{TN}}{\text{TP} + \text{FP} + \text{TN} + \text{FN}}$$

$$\text{MCC} = \frac{\text{TP} \times \text{TN} - \text{FP} \times \text{FN}}{\sqrt{(\text{TP} + \text{FP})(\text{TP} + \text{FN})(\text{TN} + \text{FP})(\text{TN} + \text{FN})}}$$