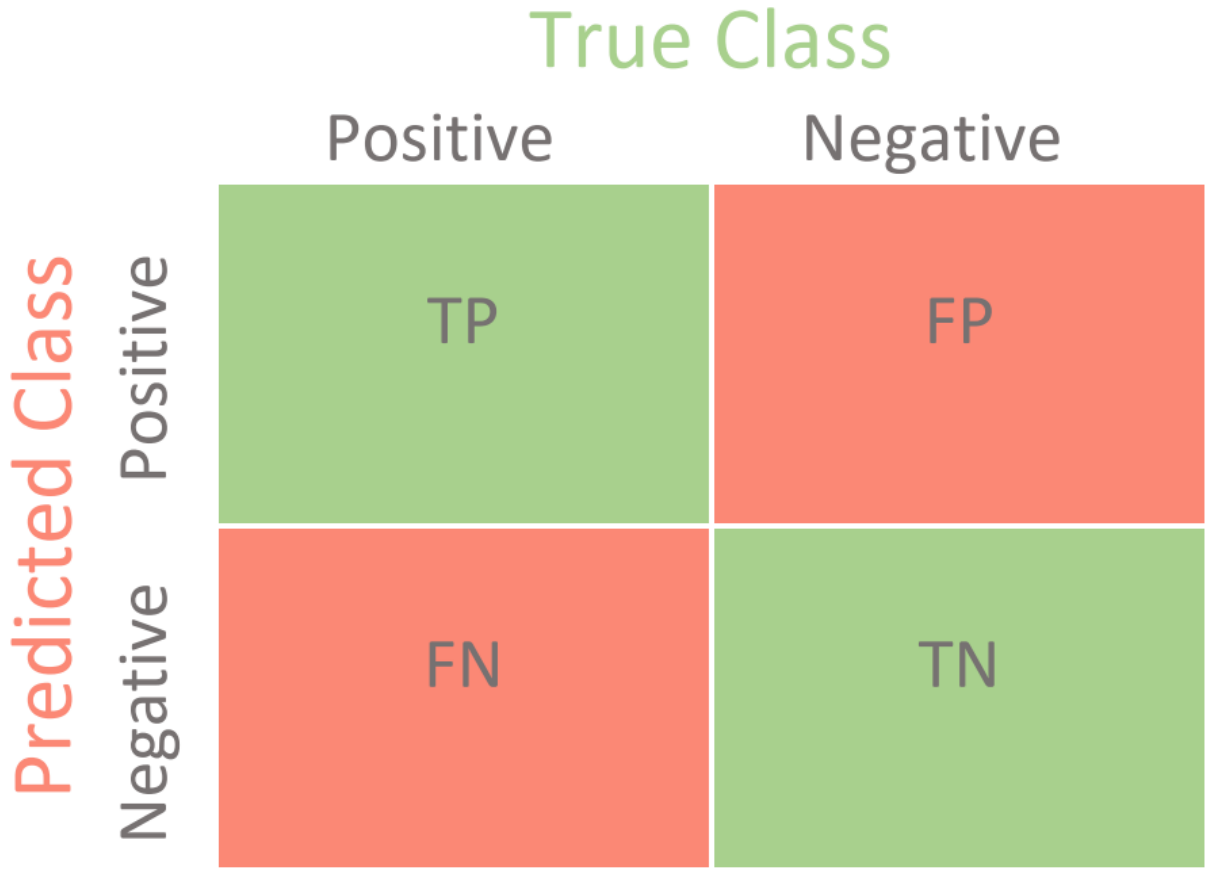
Confusion Matrix

Confusion Matrix

TP-True Positive
True class(+)=Predicted class(+)

TN-True Negative
True class(-)=Predicted class(-)

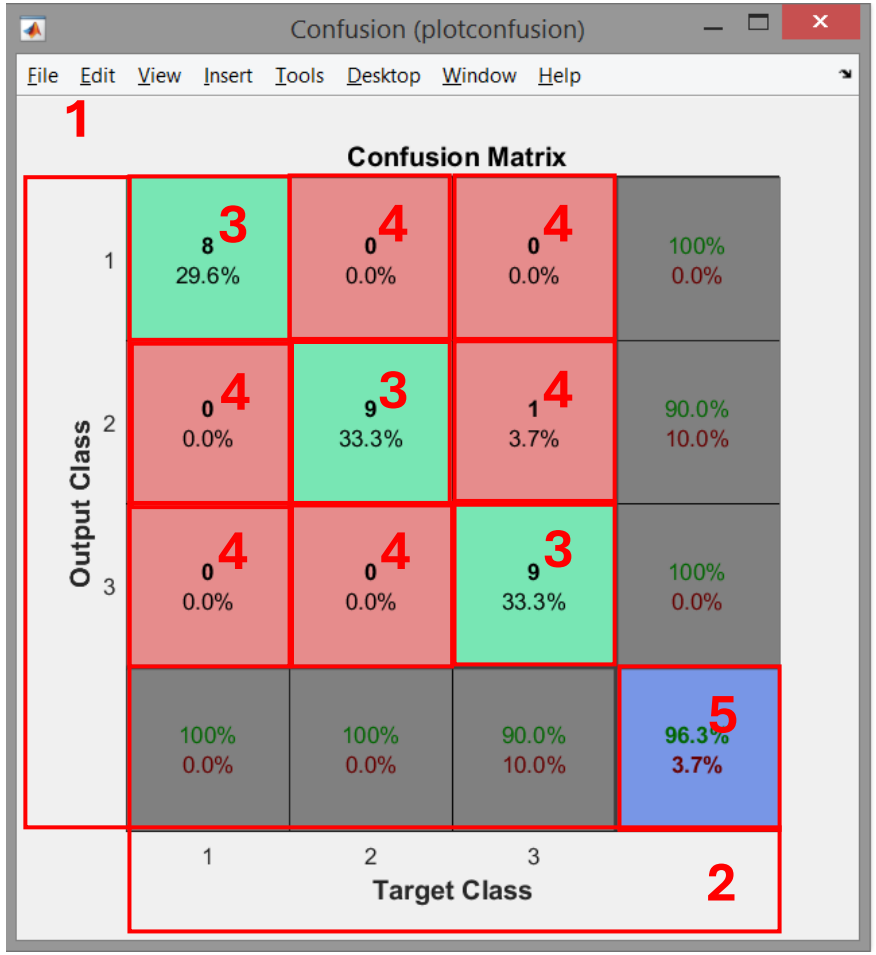
FP-False Positive
True class(-)=Predicted class(+)



Checking the performance

5. Plot confusion

1. The rows correspond to the predicted class: Output Class
2. the columns correspond to the true class: Target Class.
3. The diagonal cells correspond to observations that are correctly classified(**True Positives/True Negatives**).
4. The off-diagonal cells correspond to incorrectly classified observations(**False Negatives/False Positives**).

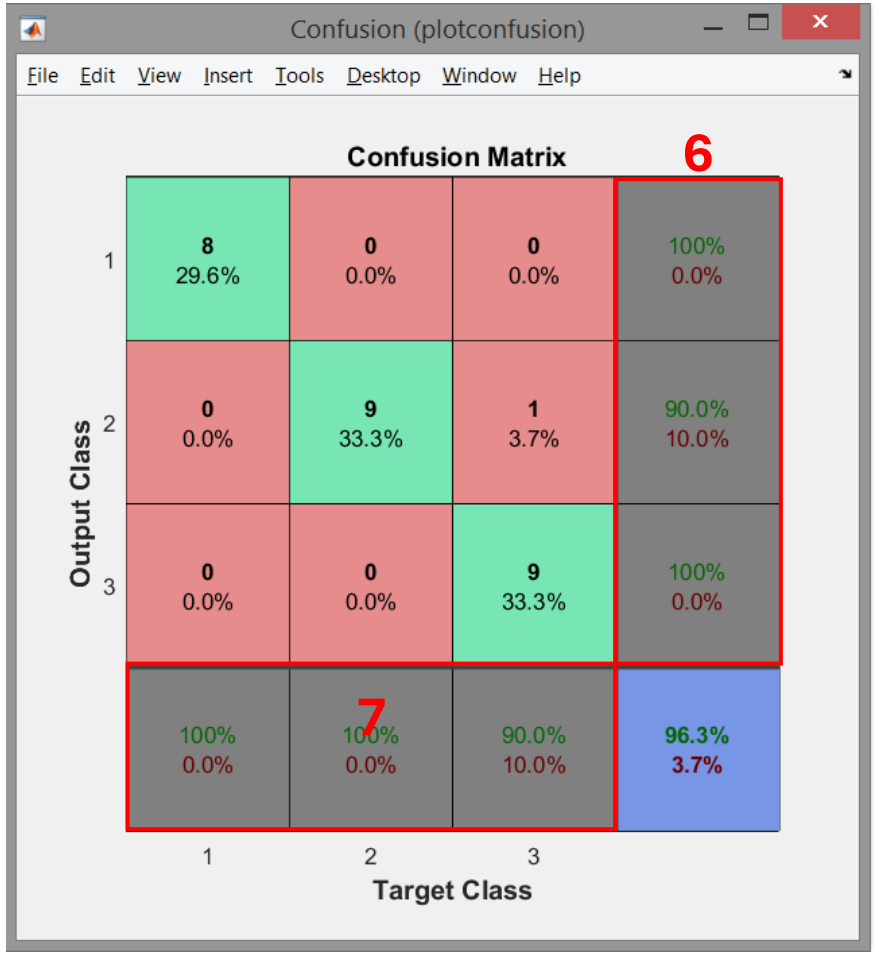


Checking the performance

5. Plot confusion

6. Precision (positive predictive value) and false (positive) discovery rate: The column on the far right of the plot shows the percentages of all the examples predicted to belong to each class that are correctly and incorrectly classified.

7. Recall (or true positive rate) and false negative rate: The row at the bottom of the plot shows the percentages of all the examples belonging to each class that are correctly and incorrectly



5. Understanding confusion matrix for multi-classes

Analyzing the confusion matrix for multi-class classification is actually one-vs-all classification. One-vs-all means one class is treated as positive class, while other classes are treated as negative classes, at a time.

Predicted Class \ Target Class	1	2	3
1	8	0	0
2	0	9	1
3	0	0	0

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1	8	0	0
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Checking the performance

5. Plot confusion

Target Class

Predicted Class	1	2	3
1	8	0	0
2	0	9	1
3	0	0	0

Target Class

Predicted Class	1	0	0
1	TP	FP	FP
0	FN	TN	TN
0	FN	TN	TN

Similar procedure can be followed for class 2 and 3, followed by calculating accuracy, sensitivity and specificity.

Checking the performance

5. Performance Metrics

$$Accuracy = \frac{TP+TN}{P+N}$$

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

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