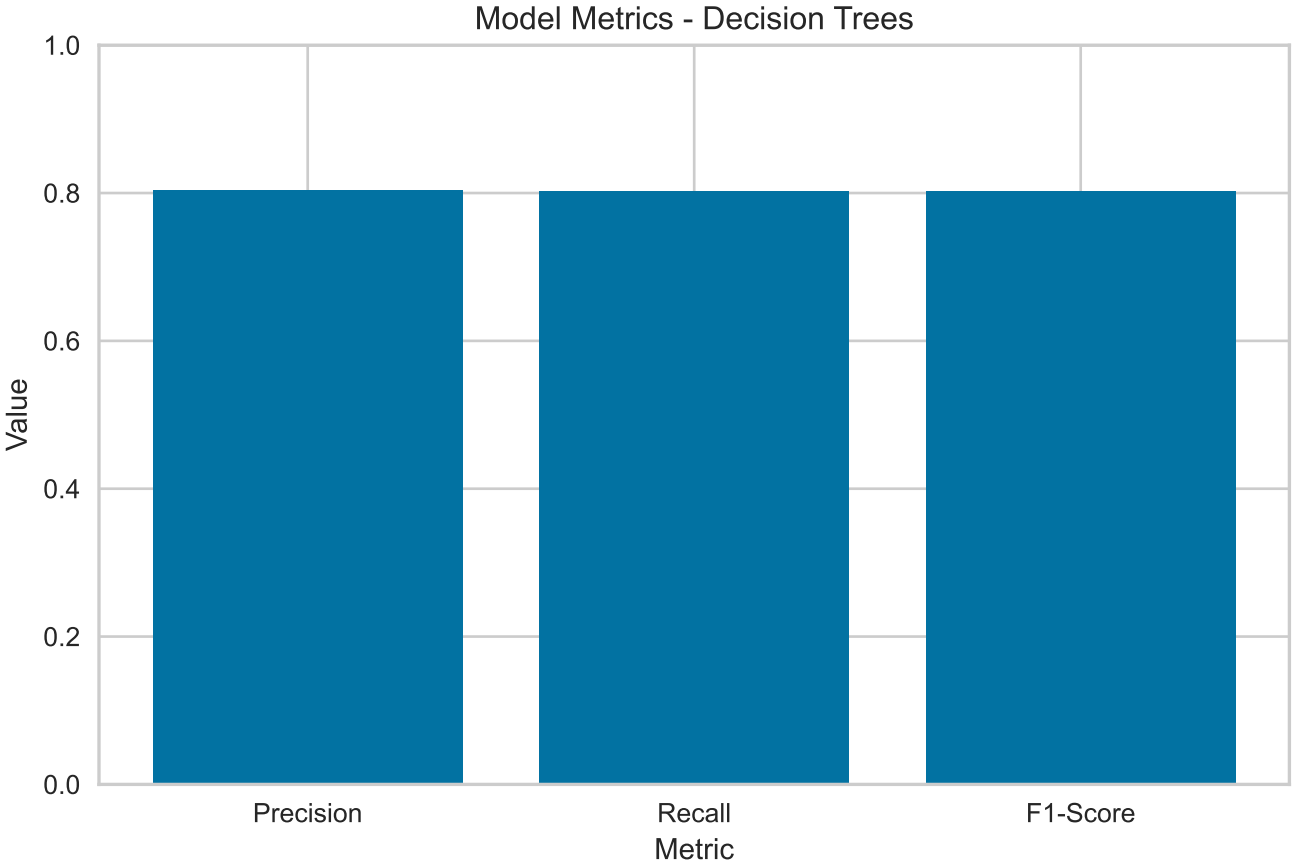
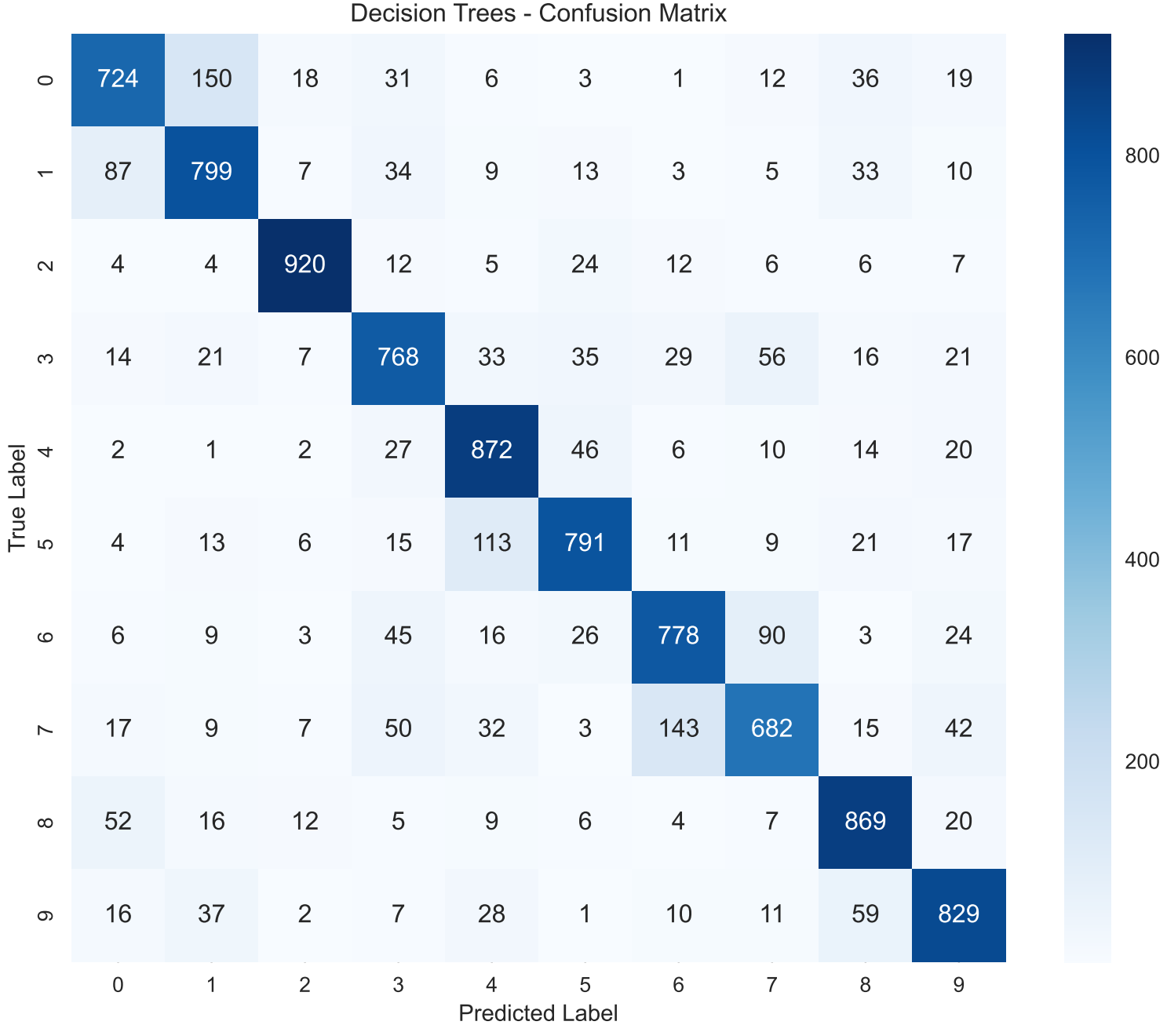
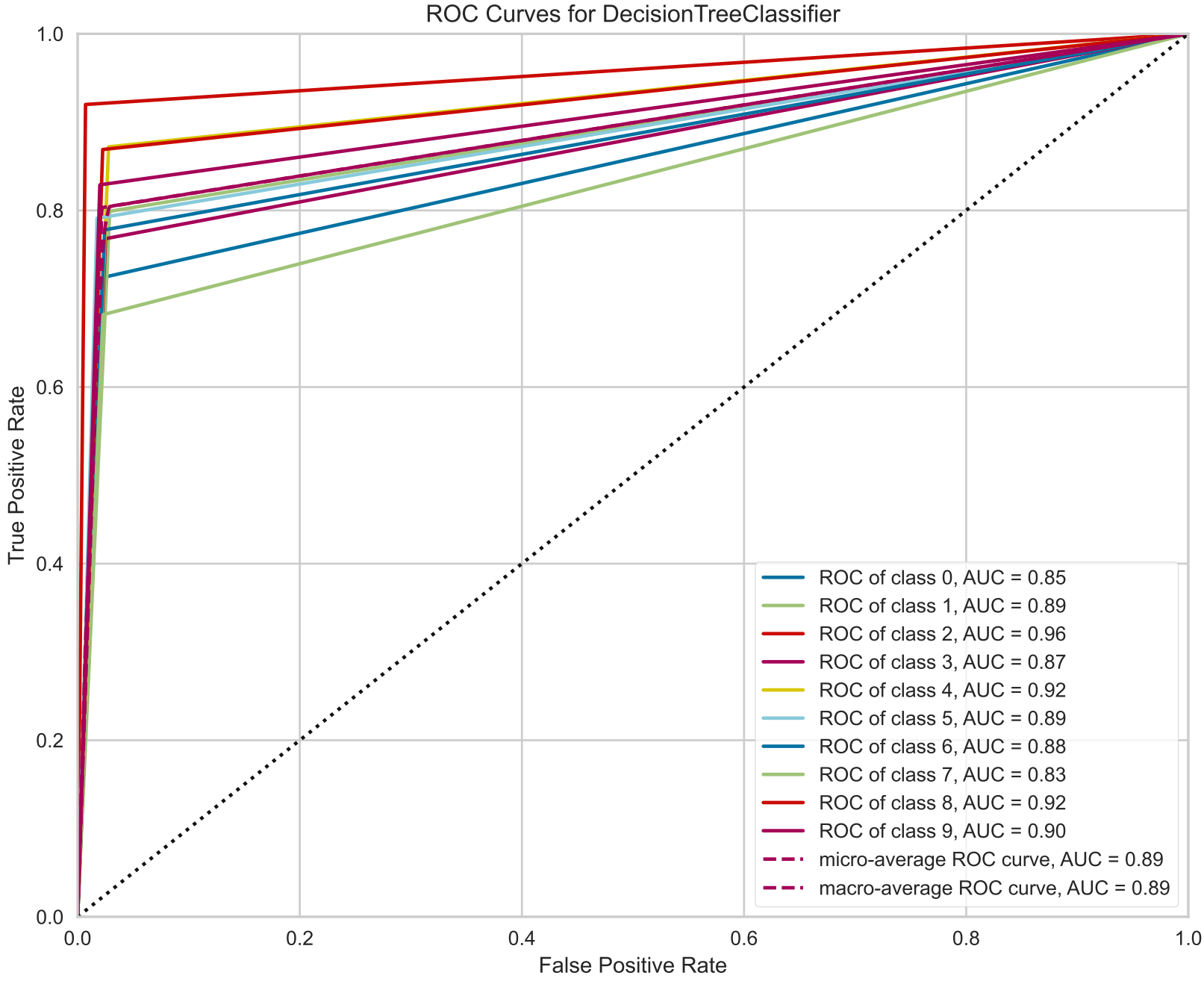
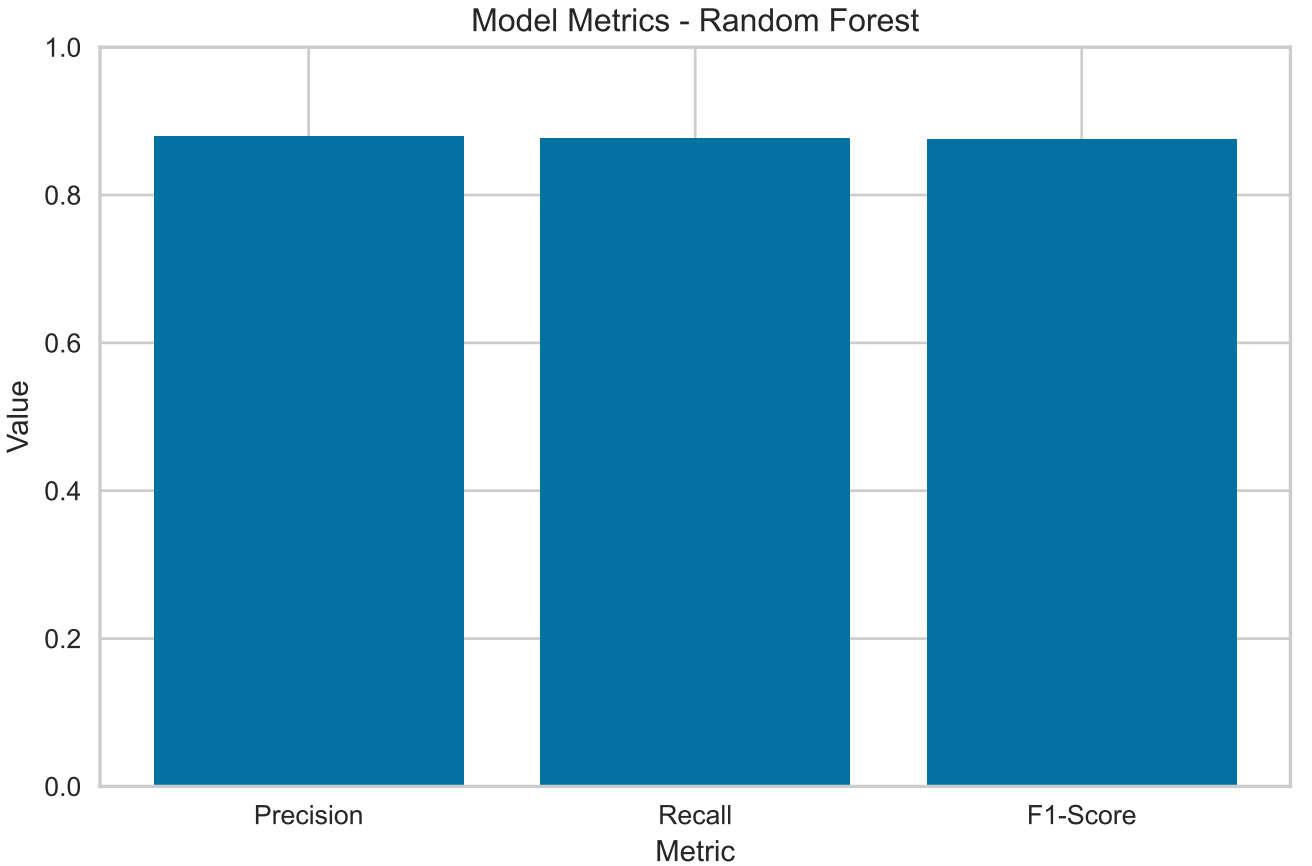
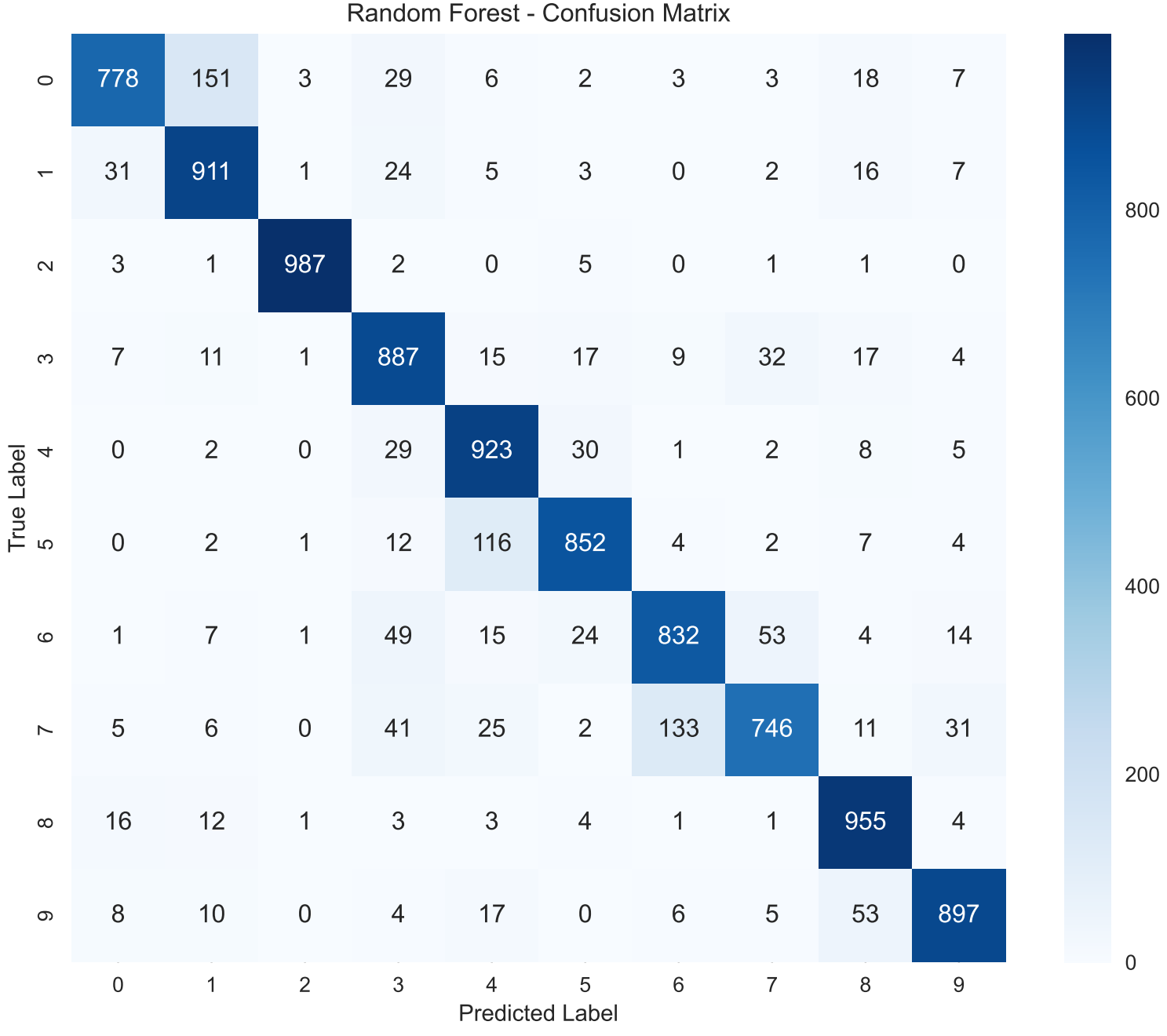
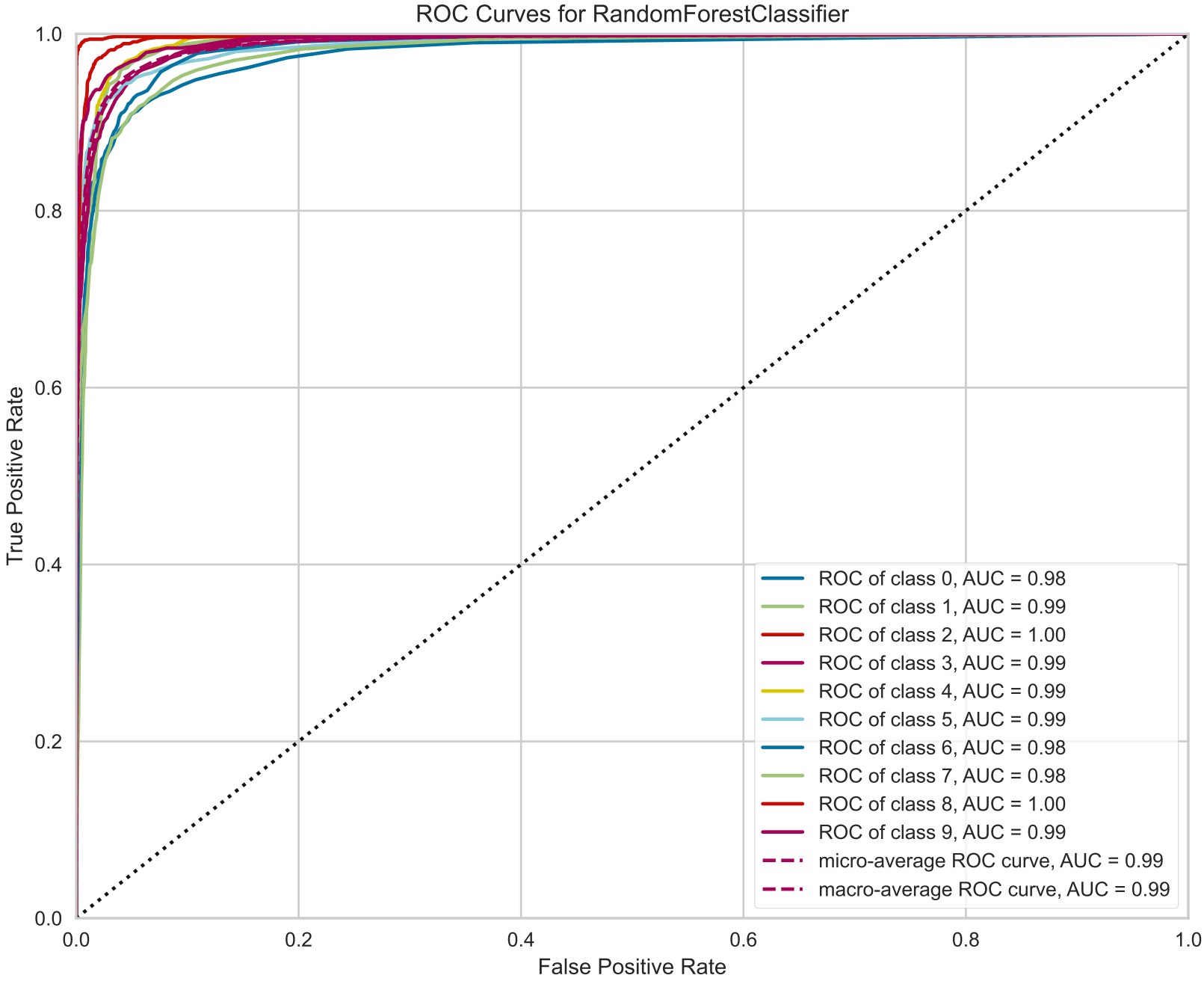

Model Metrics - Decision Trees
1.0
0.8
0.6
0.4
0.2
0.0
Value
Precision
Recall
F1-Score
Metric

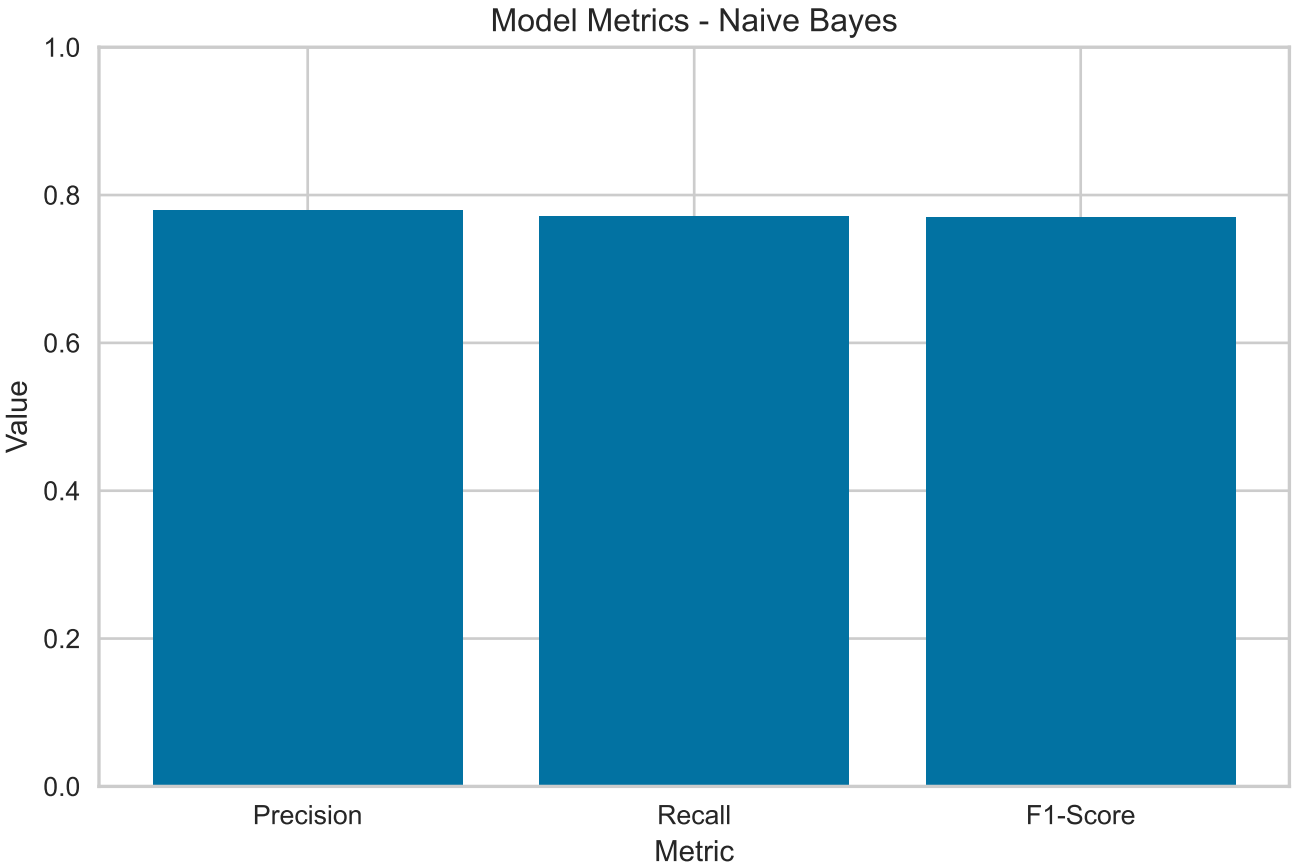

Decision Trees - Confusion Matrix
True Label
Predicted Label
0 1 2 3 4 5 6 7 8 9
724 150 18 31 6 3 1 12 36 19
87 799 7 34 9 13 3 5 33 10
4 4 920 12 5 24 12 6 6 7
14 21 7 768 33 35 29 56 16 21
2 1 2 27 872 46 6 10 14 20
4 13 6 15 113 791 11 9 21 17
6 9 3 45 16 26 778 90 3 24
17 9 7 50 32 3 143 682 15 42
52 16 12 5 9 6 4 7 869 20
16 37 2 7 28 1 10 11 59 829
800
600
400
200

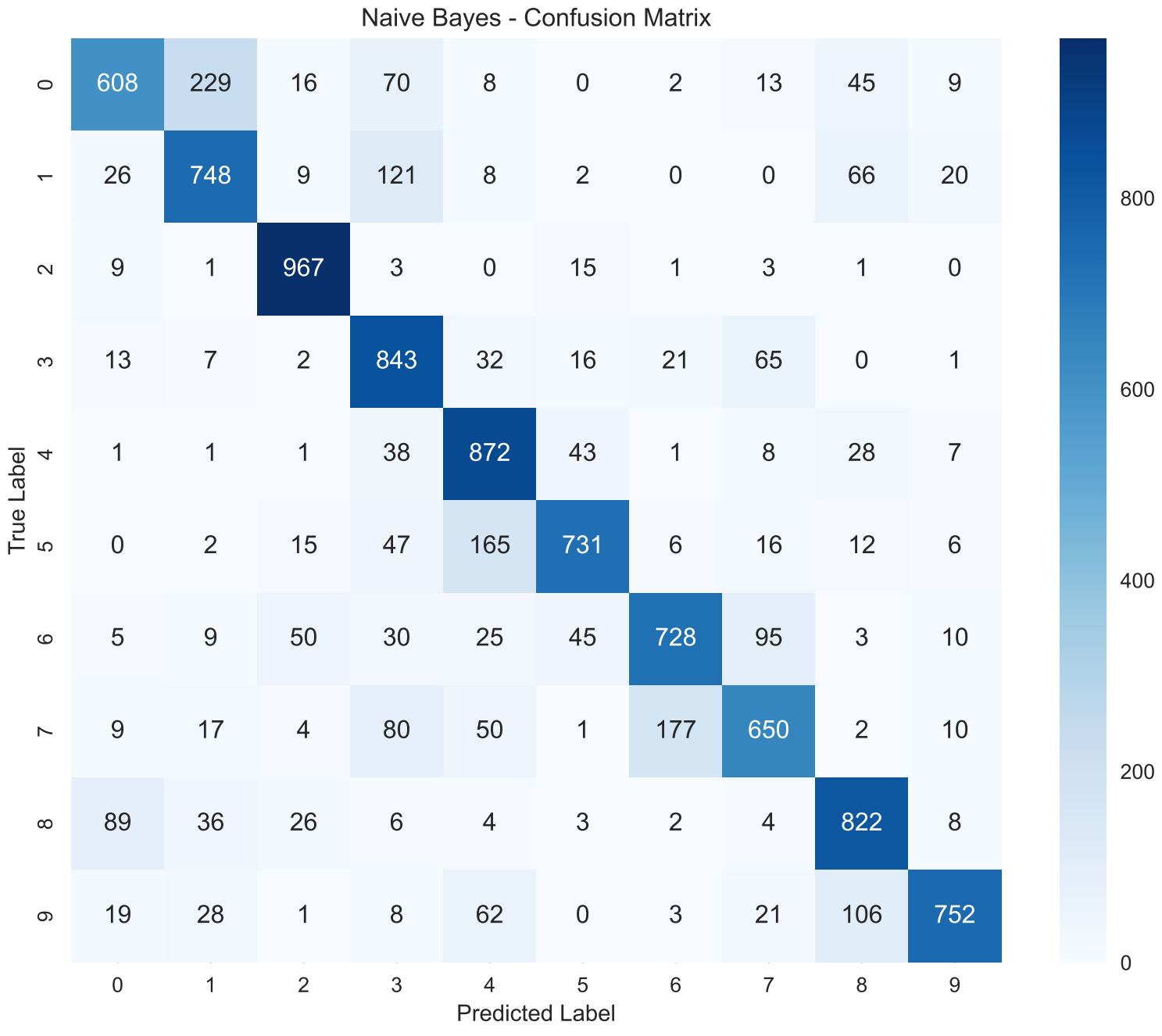

ROC Curves for DecisionTreeClassifier
True Positive Rate
False Positive Rate
0.0
0.2
0.4
0.6
0.8
1.0
ROC of class 0, AUC = 0.85
ROC of class 1, AUC = 0.89
ROC of class 2, AUC = 0.96
ROC of class 3, AUC = 0.87
ROC of class 4, AUC = 0.92
ROC of class 5, AUC = 0.89
ROC of class 6, AUC = 0.88
ROC of class 7, AUC = 0.83
ROC of class 8, AUC = 0.92
ROC of class 9, AUC = 0.90
micro-average ROC curve, AUC = 0.89
macro-average ROC curve, AUC = 0.89

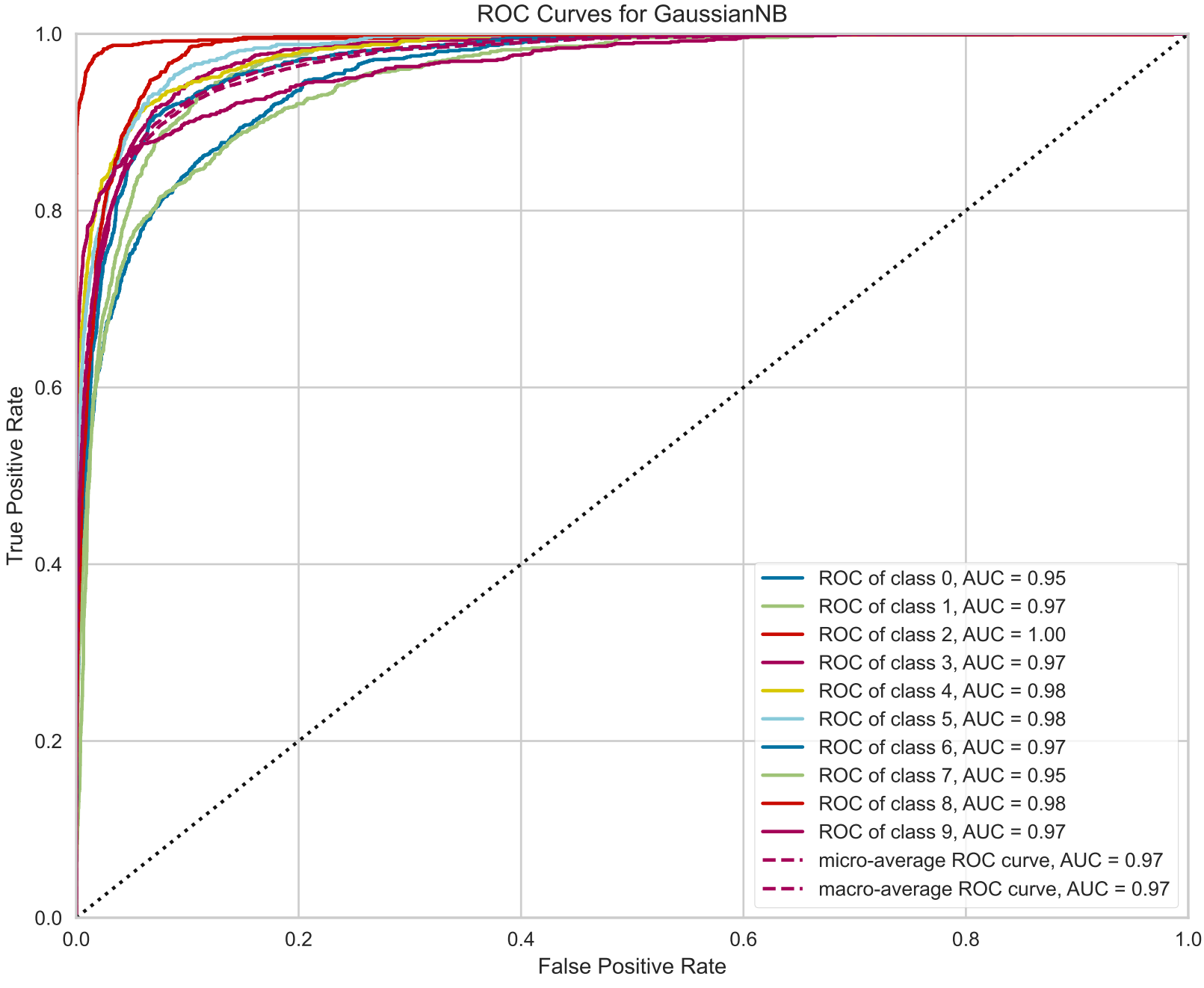

Model Metrics - Random Forest
1.0
0.8
0.6
0.4
0.2
0.0
Value
Precision
Recall
F1-Score
Metric

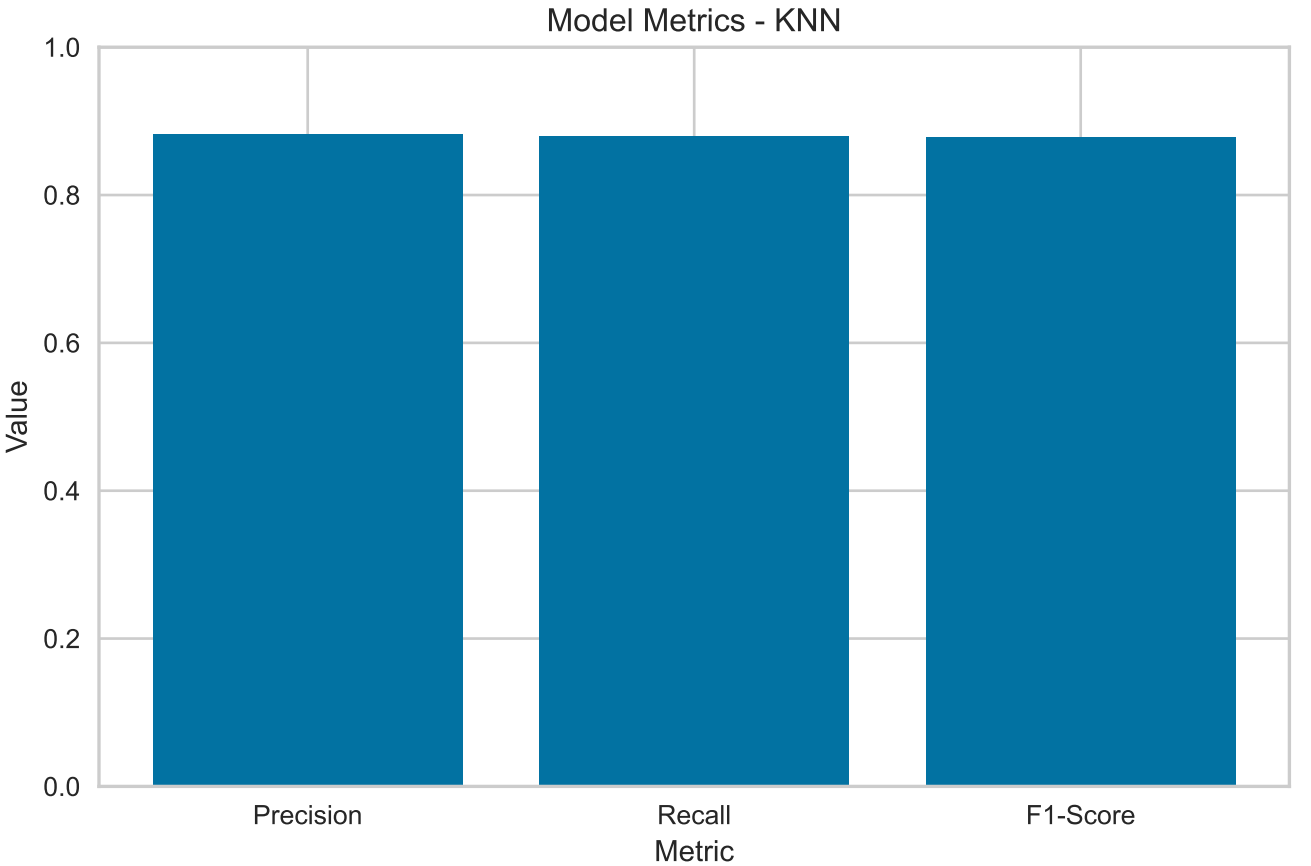

Random Forest - Confusion Matrix
True Label
Predicted Label
0 778 151 3 29 6 2 3 3 18 7
1 31 911 1 24 5 3 0 2 16 7
2 3 1 987 2 0 5 0 1 1 0
3 7 11 1 887 15 17 9 32 17 4
4 0 2 0 29 923 30 1 2 8 5
5 0 2 1 12 116 852 4 2 7 4
6 1 7 1 49 15 24 832 53 4 14
7 5 6 0 41 25 2 133 746 11 31
8 16 12 1 3 3 4 1 1 955 4
9 8 10 0 4 17 0 6 5 53 897
0 1 2 3 4 5 6 7 8 9
800
600
400
200
0

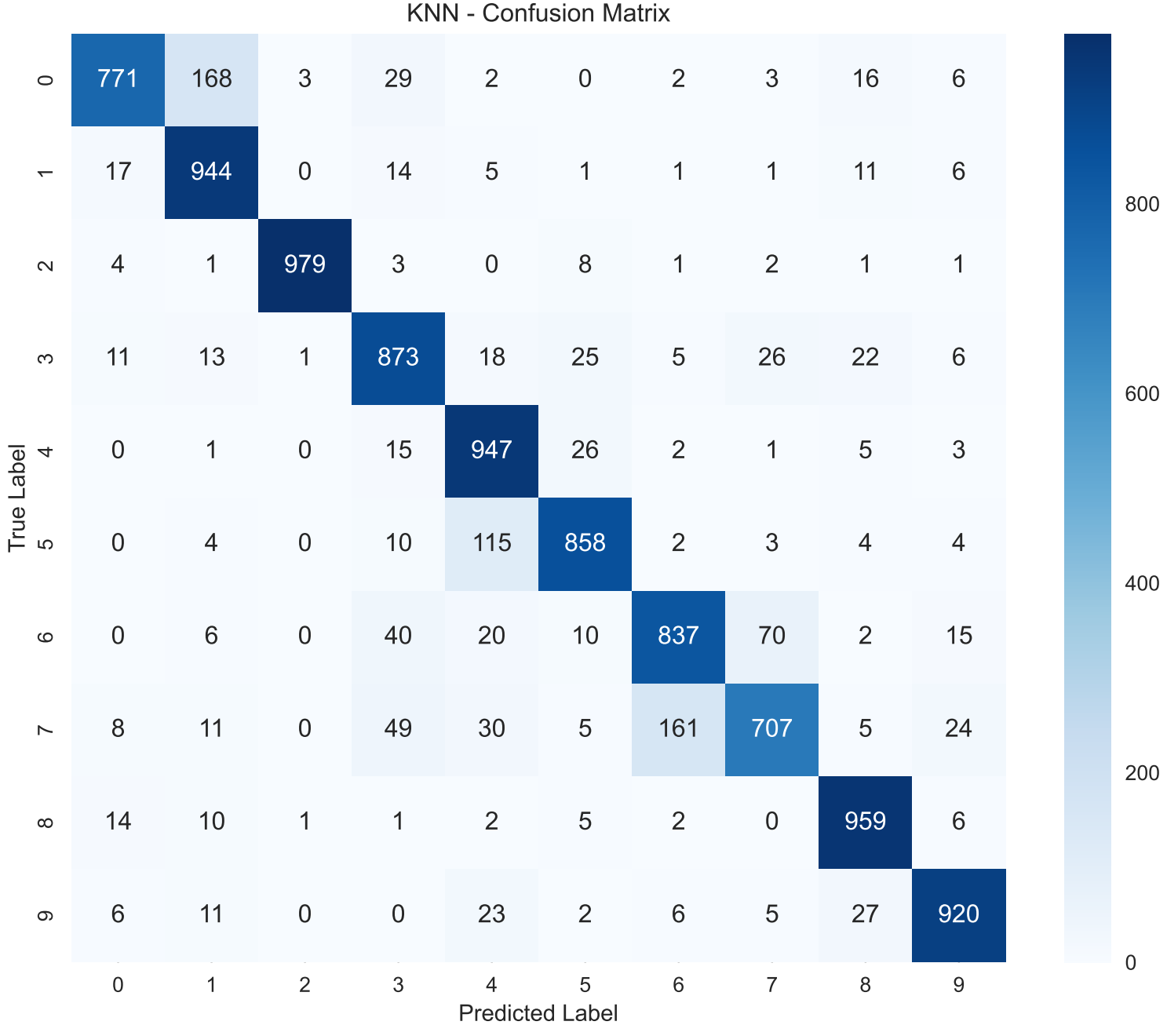

ROC Curves for RandomForestClassifier
True Positive Rate
False Positive Rate
0.0
0.2
0.4
0.6
0.8
1.0
ROC of class 0, AUC = 0.98
ROC of class 1, AUC = 0.99
ROC of class 2, AUC = 1.00
ROC of class 3, AUC = 0.99
ROC of class 4, AUC = 0.99
ROC of class 5, AUC = 0.99
ROC of class 6, AUC = 0.98
ROC of class 7, AUC = 0.98
ROC of class 8, AUC = 1.00
ROC of class 9, AUC = 0.99
micro-average ROC curve, AUC = 0.99
macro-average ROC curve, AUC = 0.99

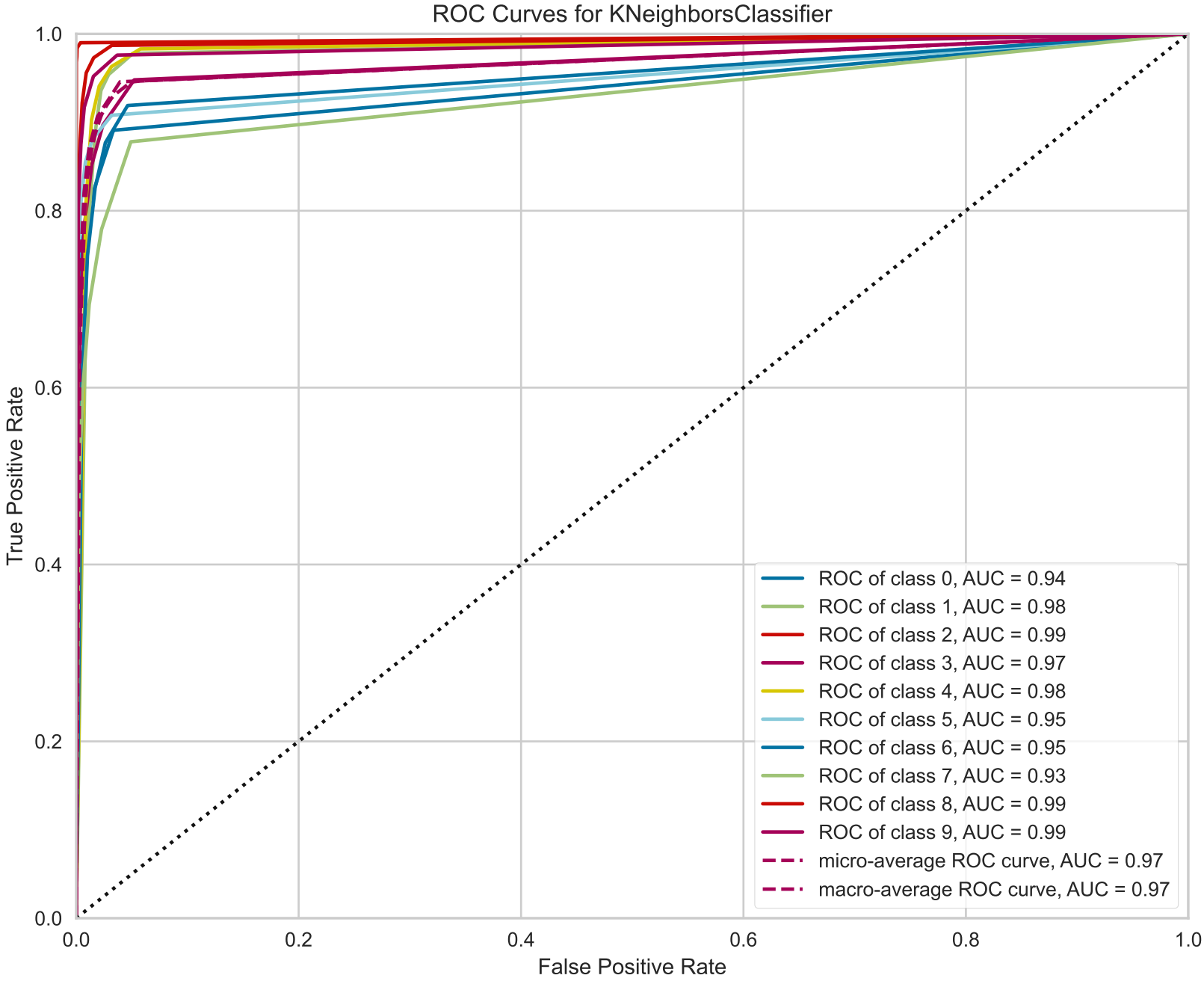

Model Metrics - Naive Bayes
1.0
0.8
0.6
0.4
0.2
0.0
Value
Precision
Recall
F1-Score
Metric

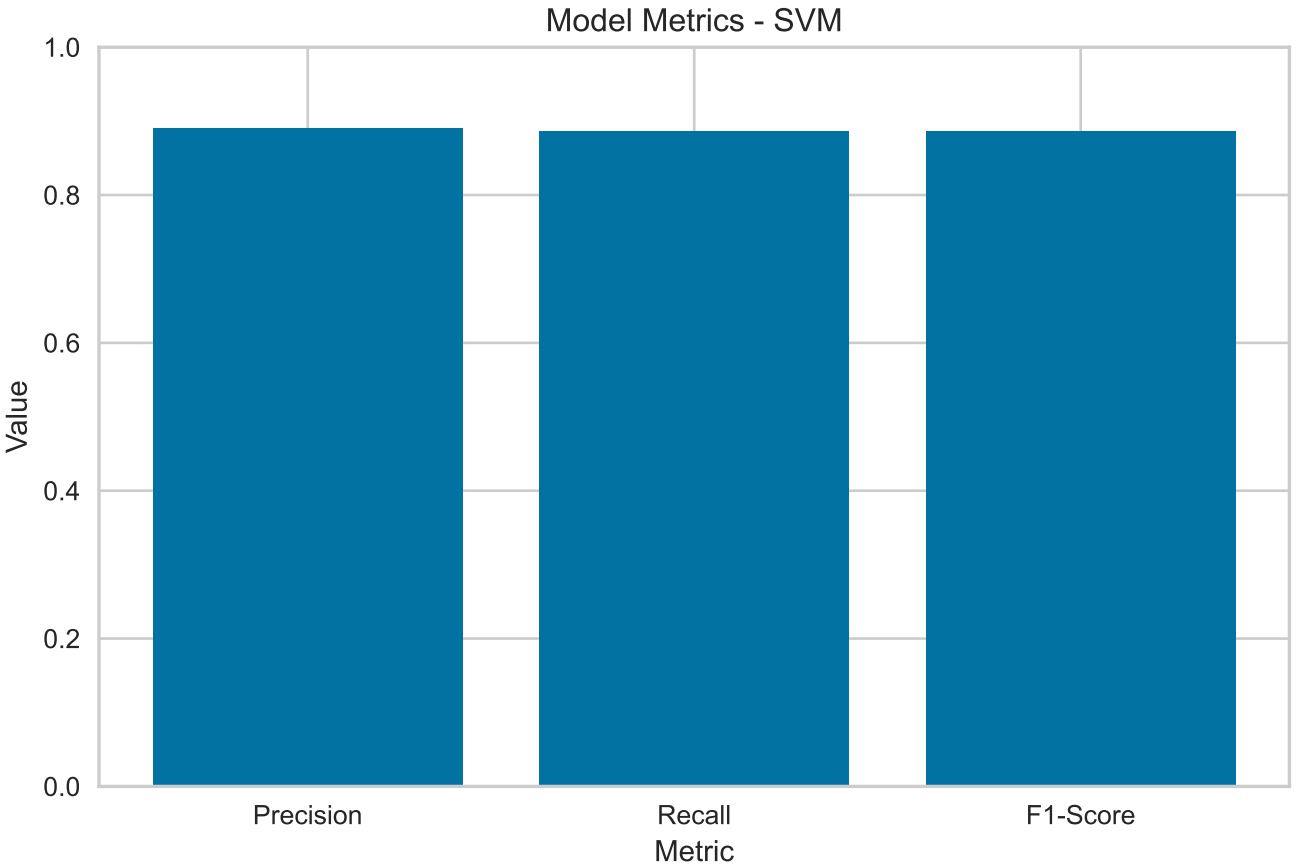

Naive Bayes - Confusion Matrix
True Label
Predicted Label
0 608 229 16 70 8 0 2 13 45 9
1 26 748 9 121 8 2 0 0 66 20
2 9 1 967 3 0 15 1 3 1 0
3 13 7 2 843 32 16 21 65 0 1
4 1 1 1 38 872 43 1 8 28 7
5 0 2 15 47 165 731 6 16 12 6
6 5 9 50 30 25 45 728 95 3 10
7 9 17 4 80 50 1 177 650 2 10
8 89 36 26 6 4 3 2 4 822 8
9 19 28 1 8 62 0 3 21 106 752
0 1 2 3 4 5 6 7 8 9
800
600
400
200
0

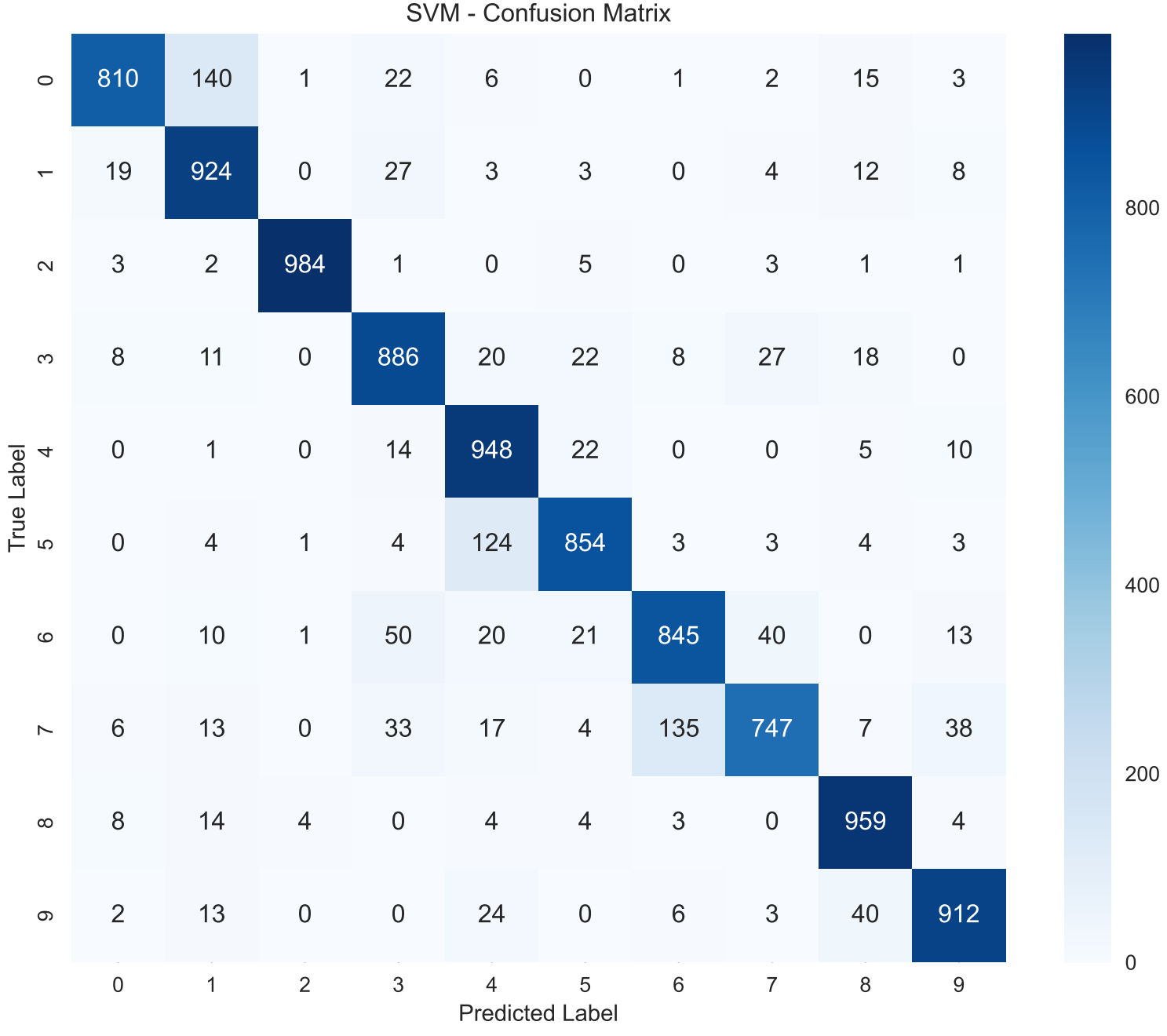

ROC Curves for GaussianNB
True Positive Rate
False Positive Rate
0.0
0.2
0.4
0.6
0.8
1.0
ROC of class 0, AUC = 0.95
ROC of class 1, AUC = 0.97
ROC of class 2, AUC = 1.00
ROC of class 3, AUC = 0.97
ROC of class 4, AUC = 0.98
ROC of class 5, AUC = 0.98
ROC of class 6, AUC = 0.97
ROC of class 7, AUC = 0.95
ROC of class 8, AUC = 0.98
ROC of class 9, AUC = 0.97
micro-average ROC curve, AUC = 0.97
macro-average ROC curve, AUC = 0.97

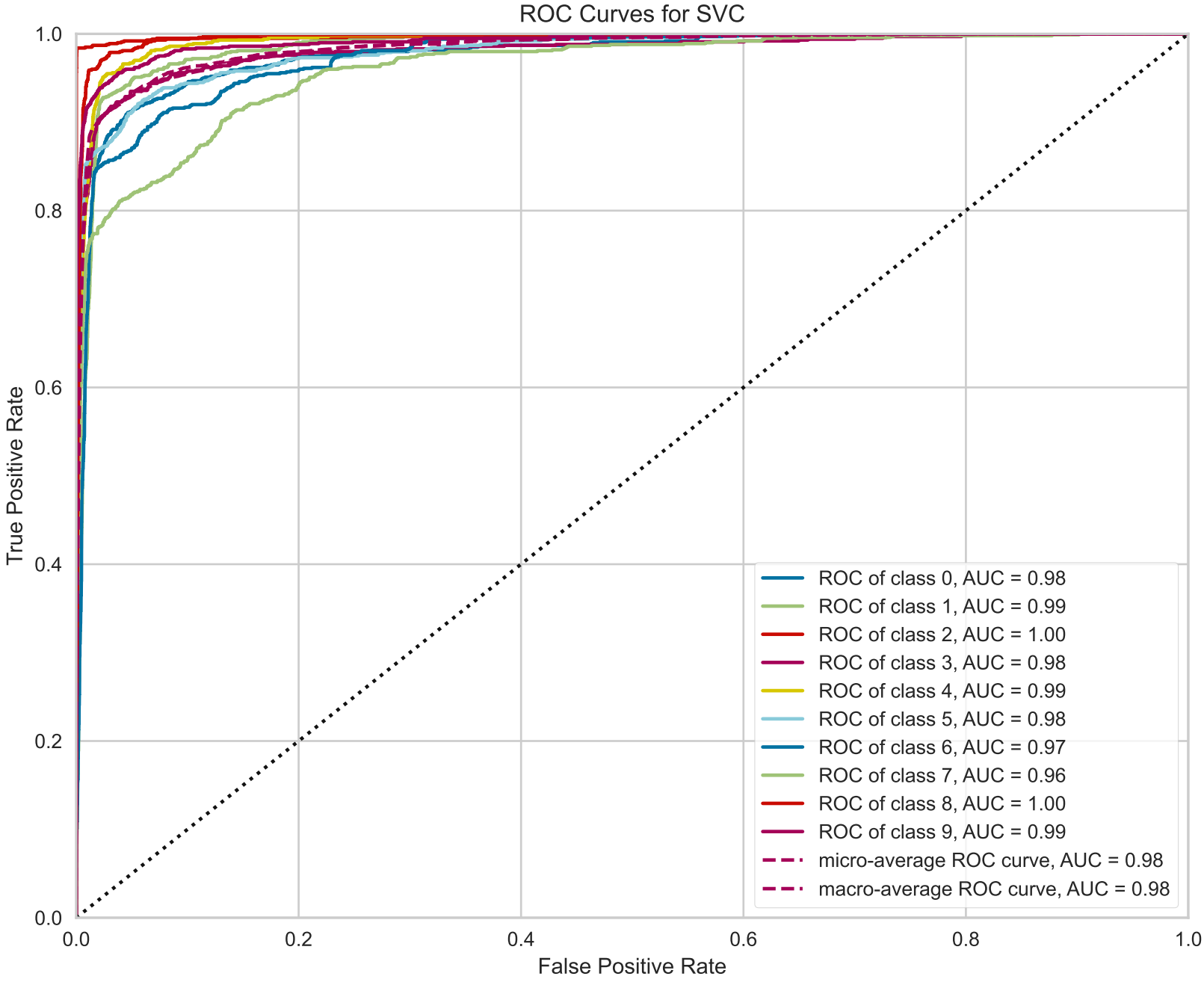

Model Metrics - KNN
1.0
0.8
0.6
0.4
0.2
0.0
Value
Precision
Recall
F1-Score
Metric


KNN - Confusion Matrix
True Label
Predicted Label
0 1 2 3 4 5 6 7 8 9
771 168 3 29 2 0 2 3 16 6
17 944 0 14 5 1 1 1 11 6
4 1 979 3 0 8 1 2 1 1
11 13 1 873 18 25 5 26 22 6
0 1 0 15 947 26 2 1 5 3
0 4 0 10 115 858 2 3 4 4
0 6 0 40 20 10 837 70 2 15
8 11 0 49 30 5 161 707 5 24
14 10 1 1 2 5 2 0 959 6
6 11 0 0 23 2 6 5 27 920
800
600
400
200
0


ROC Curves for KNeighborsClassifier
True Positive Rate
False Positive Rate
0.0
0.2
0.4
0.6
0.8
1.0
ROC of class 0, AUC = 0.94
ROC of class 1, AUC = 0.98
ROC of class 2, AUC = 0.99
ROC of class 3, AUC = 0.97
ROC of class 4, AUC = 0.98
ROC of class 5, AUC = 0.95
ROC of class 6, AUC = 0.95
ROC of class 7, AUC = 0.93
ROC of class 8, AUC = 0.99
ROC of class 9, AUC = 0.99
micro-average ROC curve, AUC = 0.97
macro-average ROC curve, AUC = 0.97


Model Metrics - SVM
1.0
0.8
0.6
0.4
0.2
0.0
Value
Precision
Recall
F1-Score
Metric


SVM - Confusion Matrix
True Label
Predicted Label
0 1 2 3 4 5 6 7 8 9
810 140 1 22 6 0 1 2 15 3
19 924 0 27 3 3 0 4 12 8
3 2 984 1 0 5 0 3 1 1
8 11 0 886 20 22 8 27 18 0
0 1 0 14 948 22 0 0 5 10
0 4 1 4 124 854 3 3 4 3
0 10 1 50 20 21 845 40 0 13
6 13 0 33 17 4 135 747 7 38
8 14 4 0 4 4 3 0 959 4
2 13 0 0 24 0 6 3 40 912
800
600
400
200
0


ROC Curves for SVC
True Positive Rate
False Positive Rate
0.0
0.2
0.4
0.6
0.8
1.0
ROC of class 0, AUC = 0.98
ROC of class 1, AUC = 0.99
ROC of class 2, AUC = 1.00
ROC of class 3, AUC = 0.98
ROC of class 4, AUC = 0.99
ROC of class 5, AUC = 0.98
ROC of class 6, AUC = 0.97
ROC of class 7, AUC = 0.96
ROC of class 8, AUC = 1.00
ROC of class 9, AUC = 0.99
micro-average ROC curve, AUC = 0.98
macro-average ROC curve, AUC = 0.98

Model Comparison - PCA 10 components

Model	Precision	Recall	F1-Score
Decision Trees	0.8035416625102709	0.8032	0.8024962140655383
Random Forest	0.8795976767937832	0.8768	0.8761233318514007
Naive Bayes	0.7790337391867951	0.7721	0.7707185914588635
KNN	0.8827927334912907	0.8795	0.8784246665876294
SVM	0.8904705795500677	0.8869	0.8863721283608335