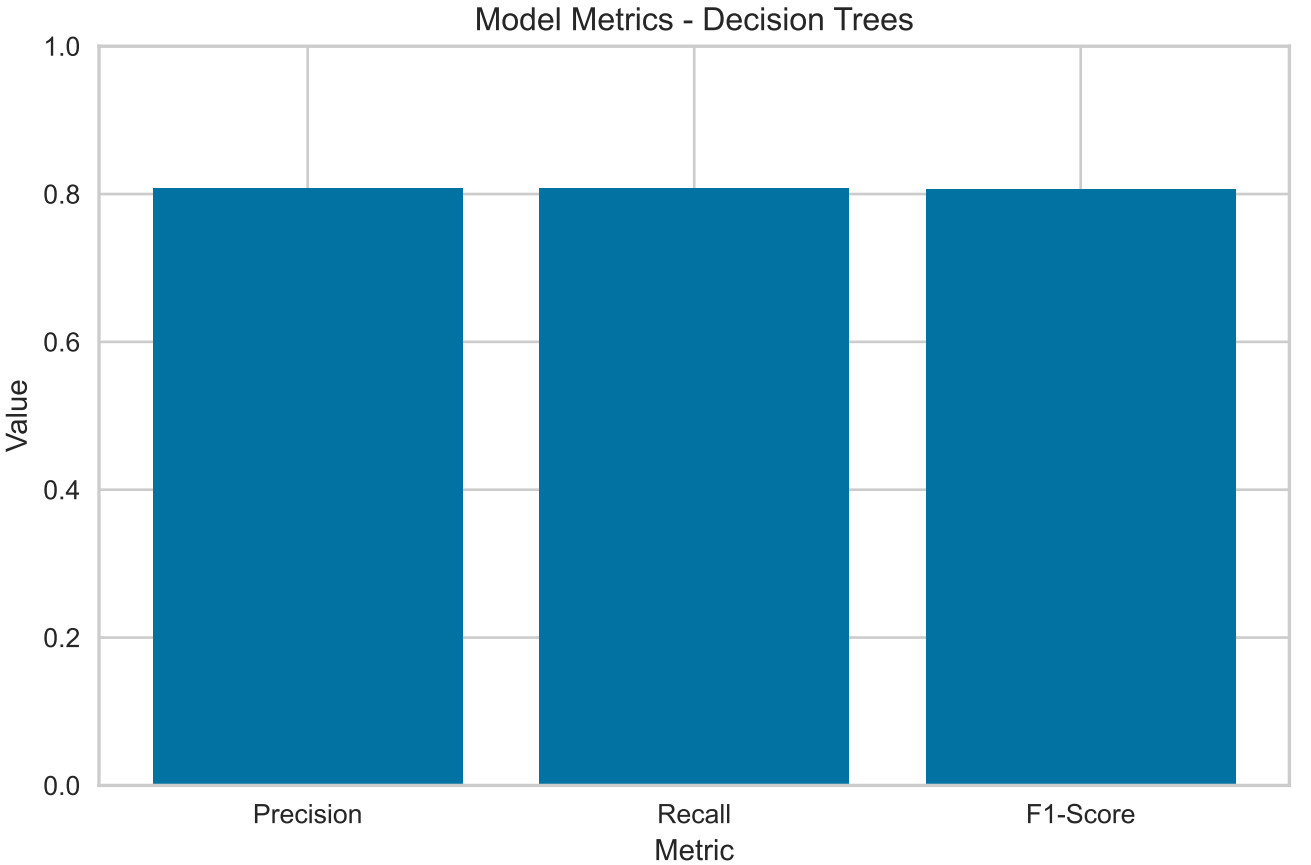
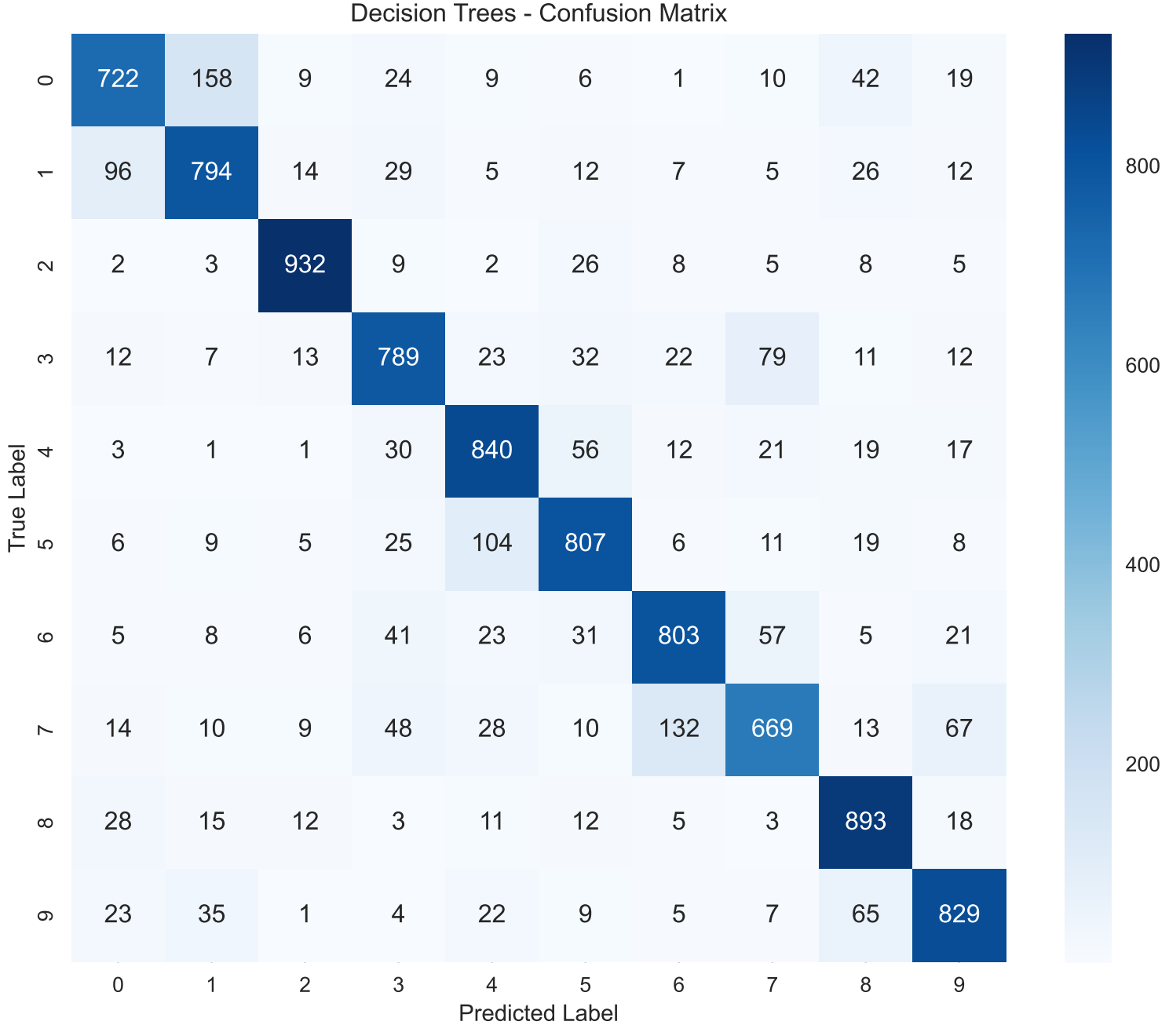
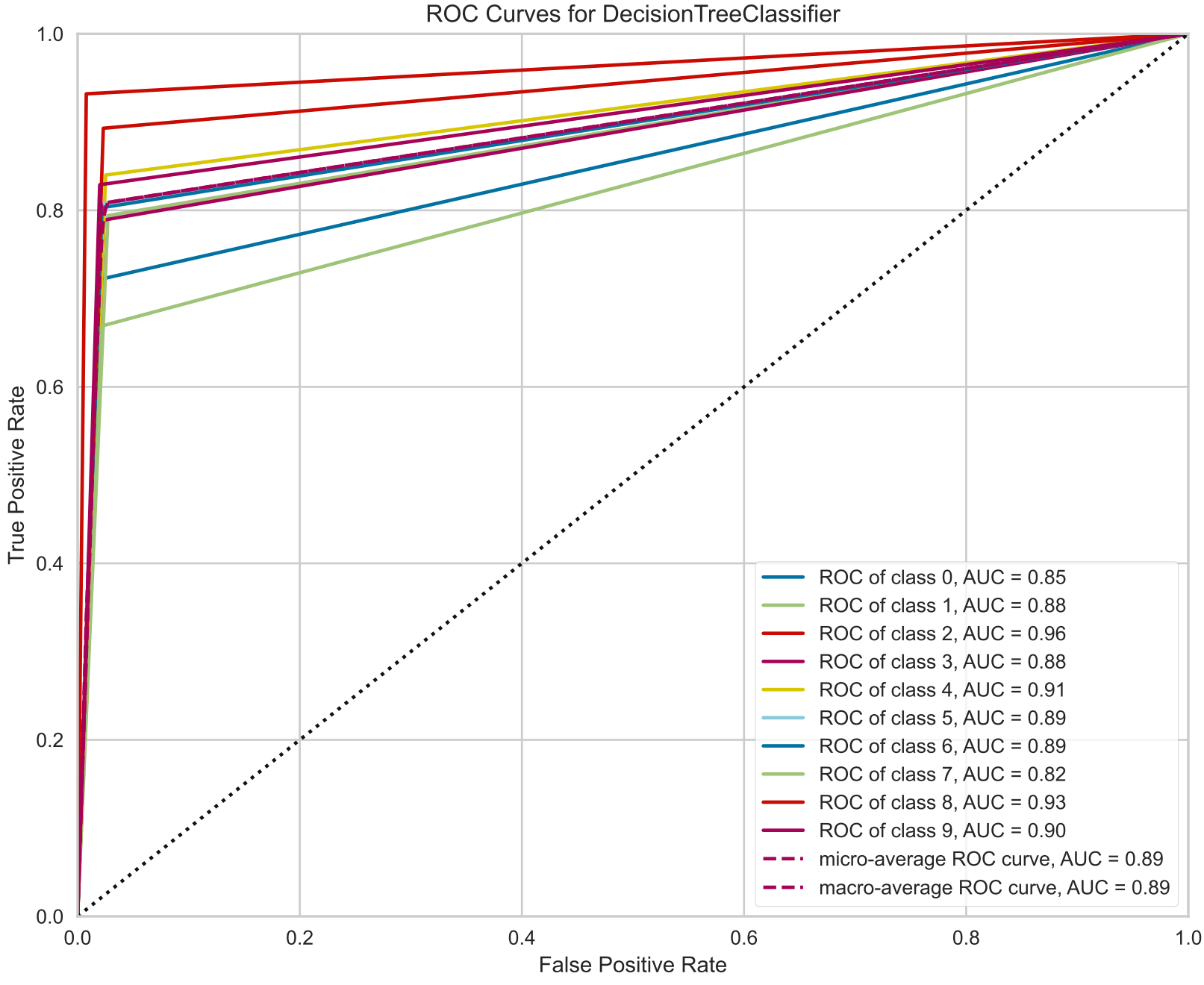
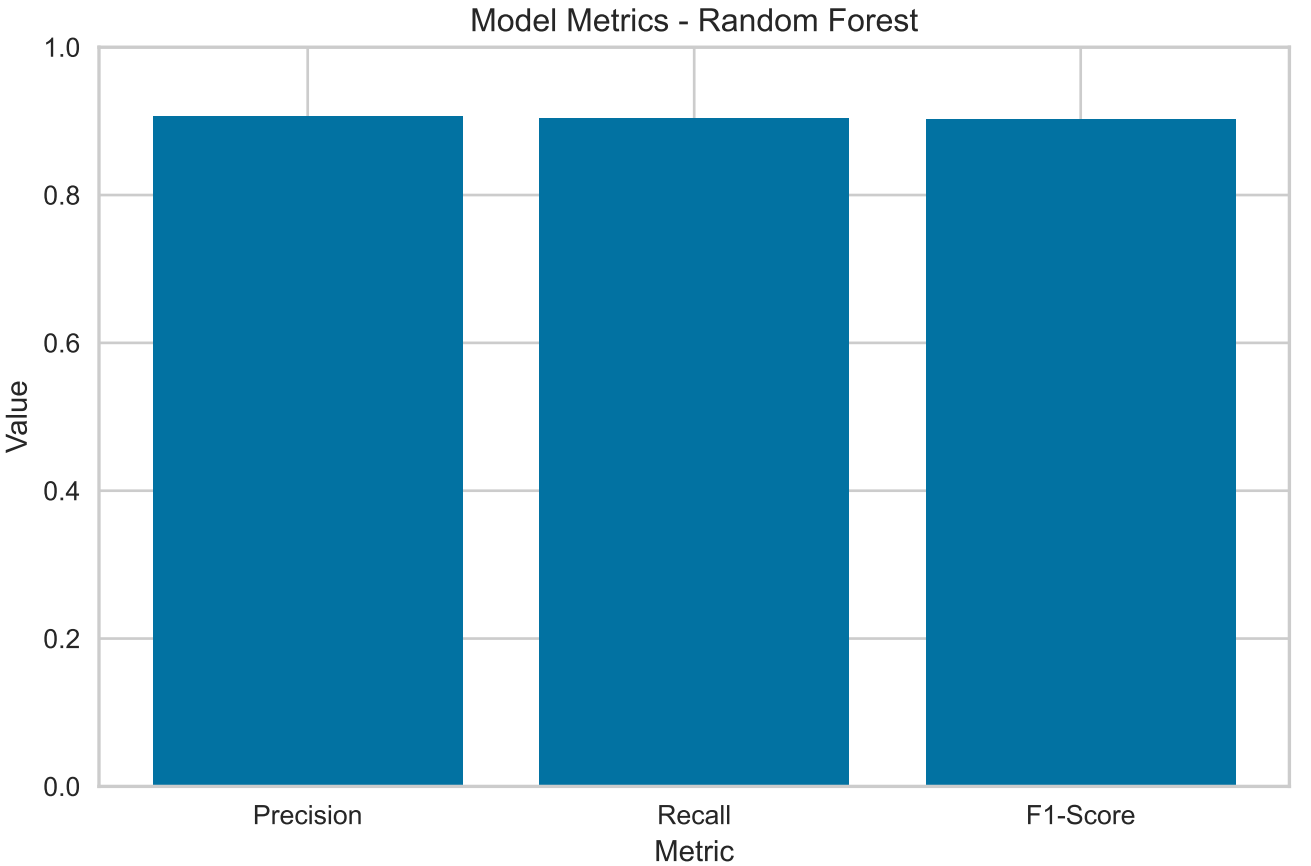
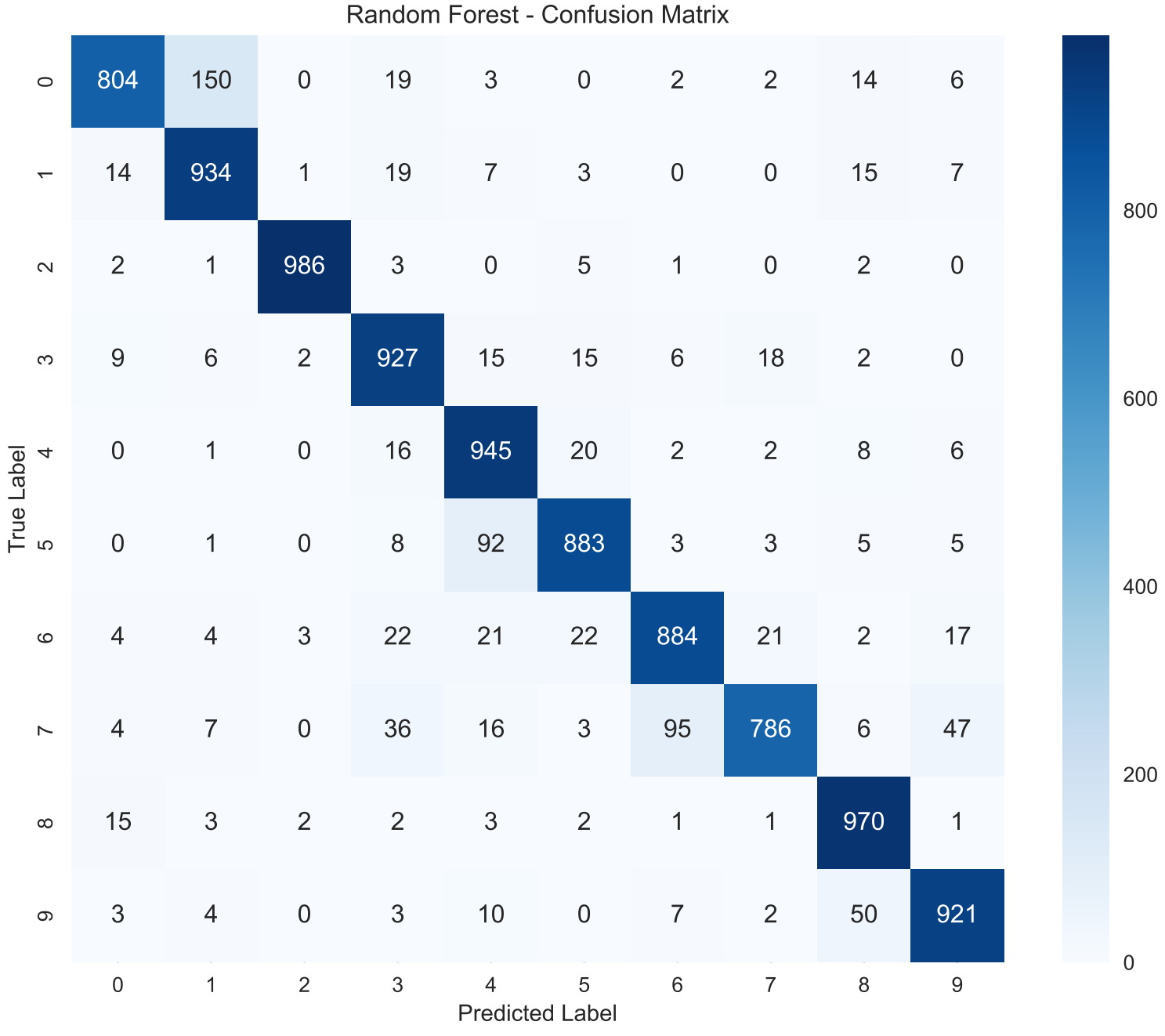
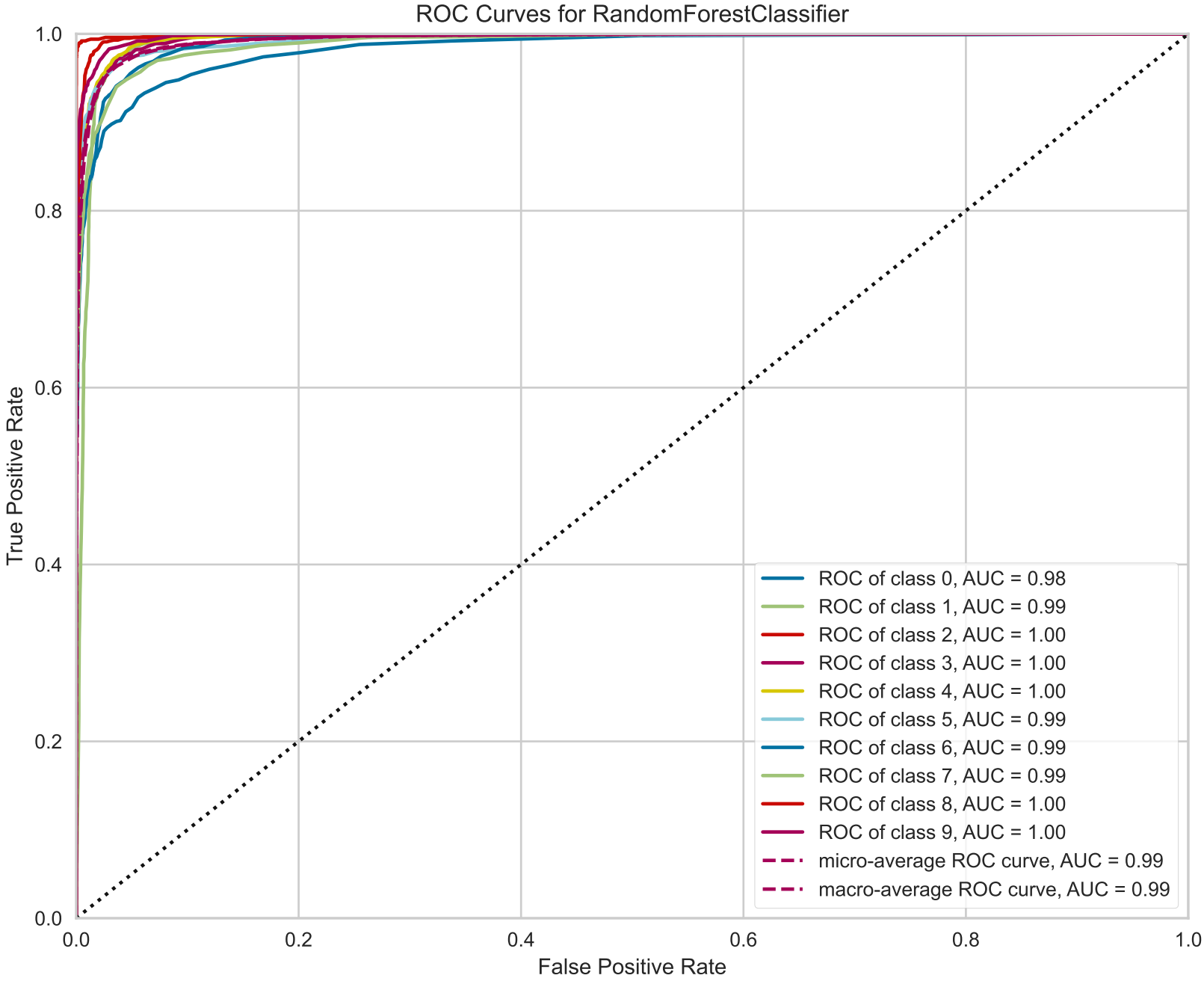

Model Metrics - Decision Trees
1.0
0.8
0.6
0.4
0.2
0.0
Value
Precision
Recall
F1-Score
Metric

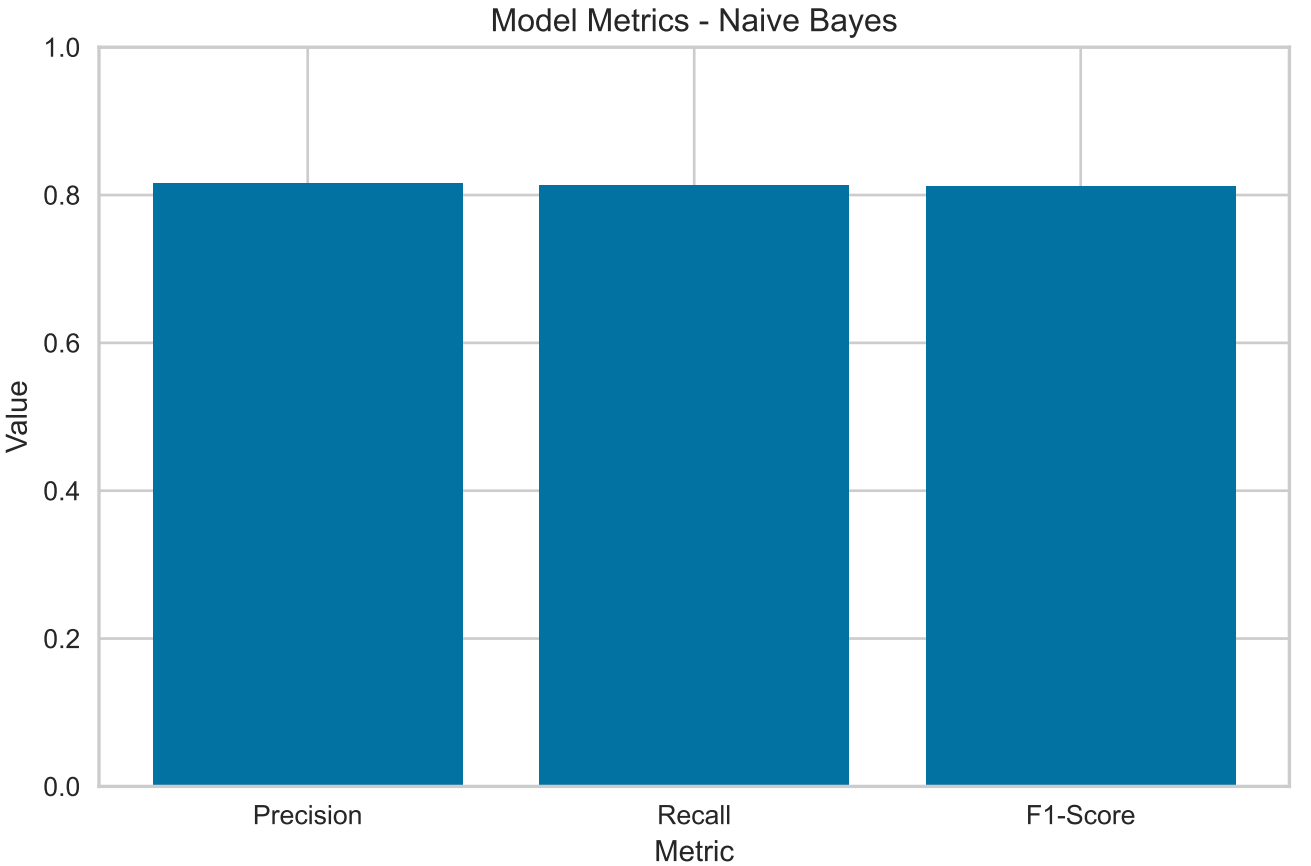

Decision Trees - Confusion Matrix
True Label
Predicted Label
0 1 2 3 4 5 6 7 8 9
0 722 158 9 24 9 6 1 10 42 19
1 96 794 14 29 5 12 7 5 26 12
2 2 3 932 9 2 26 8 5 8 5
3 12 7 13 789 23 32 22 79 11 12
4 3 1 1 30 840 56 12 21 19 17
5 6 9 5 25 104 807 6 11 19 8
6 5 8 6 41 23 31 803 57 5 21
7 14 10 9 48 28 10 132 669 13 67
8 28 15 12 3 11 12 5 3 893 18
9 23 35 1 4 22 9 5 7 65 829
800
600
400
200

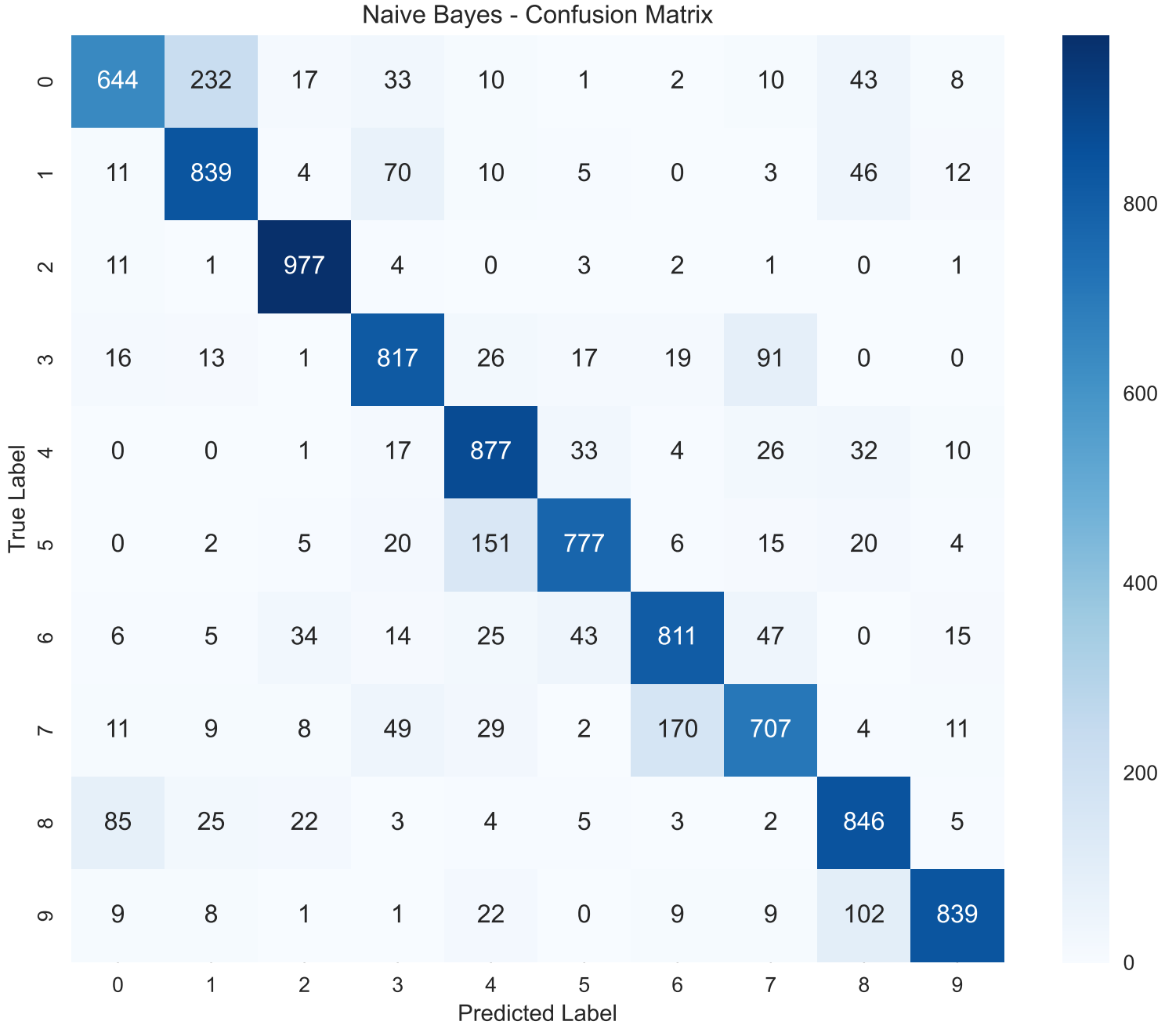

ROC Curves for DecisionTreeClassifier
True Positive Rate
False Positive Rate
0.0
0.2
0.4
0.6
0.8
1.0
ROC of class 0, AUC = 0.85
ROC of class 1, AUC = 0.88
ROC of class 2, AUC = 0.96
ROC of class 3, AUC = 0.88
ROC of class 4, AUC = 0.91
ROC of class 5, AUC = 0.89
ROC of class 6, AUC = 0.89
ROC of class 7, AUC = 0.82
ROC of class 8, AUC = 0.93
ROC of class 9, AUC = 0.90
micro-average ROC curve, AUC = 0.89
macro-average ROC curve, AUC = 0.89

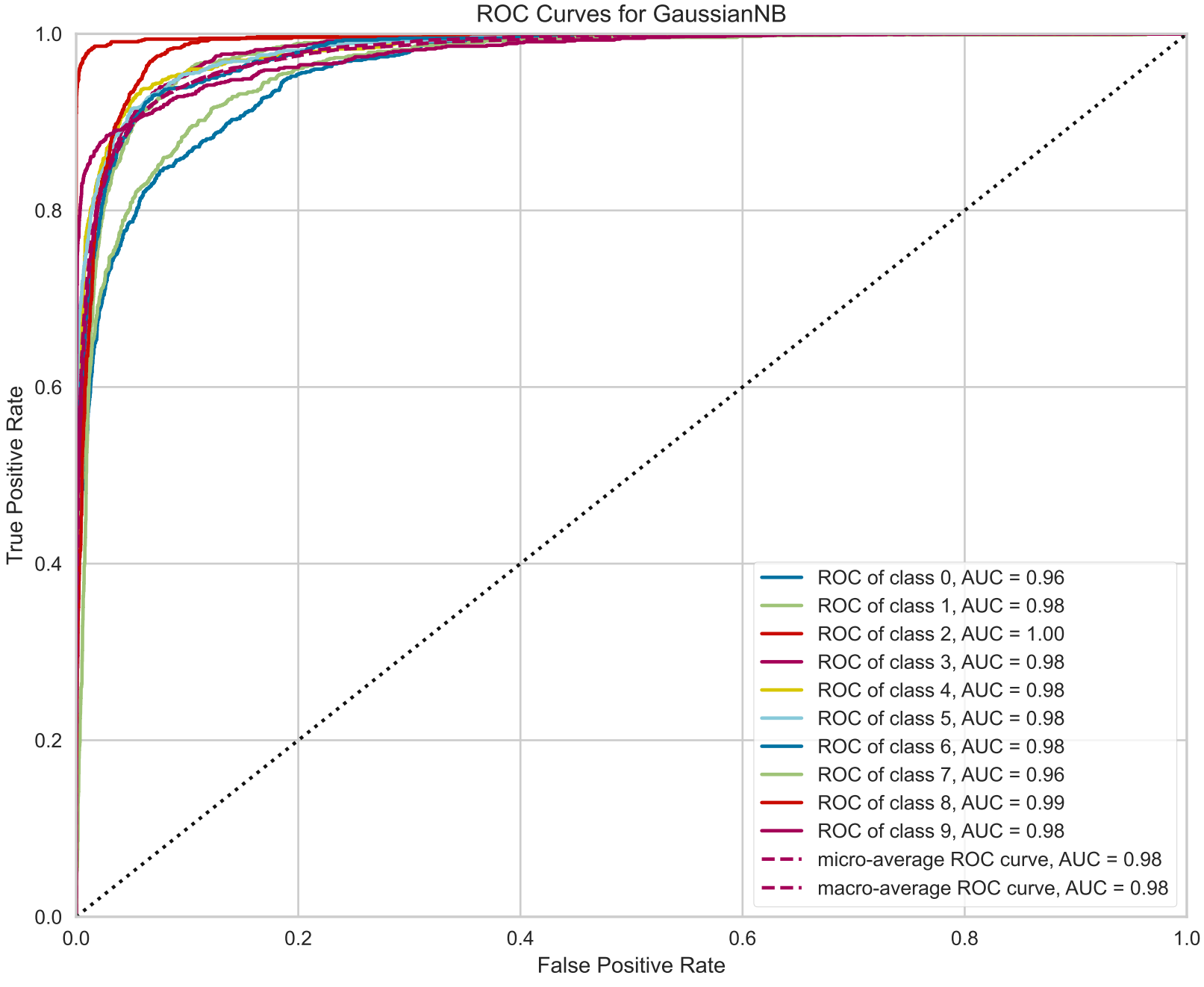

Model Metrics - Random Forest
1.0
0.8
0.6
0.4
0.2
0.0
Value
Precision
Recall
F1-Score
Metric

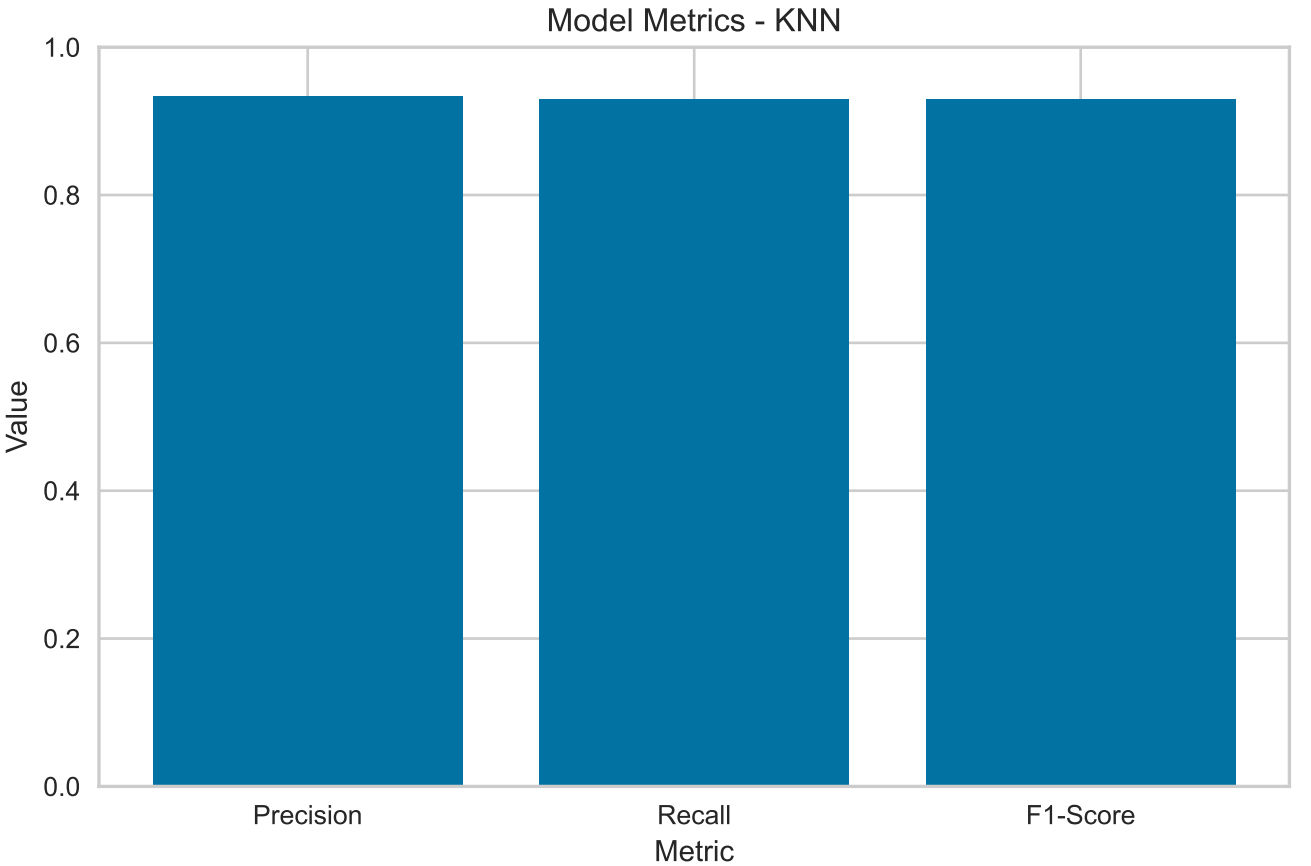

Random Forest - Confusion Matrix
True Label
Predicted Label
0 804 150 0 19 3 0 2 2 14 6
1 14 934 1 19 7 3 0 0 15 7
2 2 1 986 3 0 5 1 0 2 0
3 9 6 2 927 15 15 6 18 2 0
4 0 1 0 16 945 20 2 2 8 6
5 0 1 0 8 92 883 3 3 5 5
6 4 4 3 22 21 22 884 21 2 17
7 4 7 0 36 16 3 95 786 6 47
8 15 3 2 2 3 2 1 1 970 1
9 3 4 0 3 10 0 7 2 50 921
0 1 2 3 4 5 6 7 8 9
800
600
400
200
0

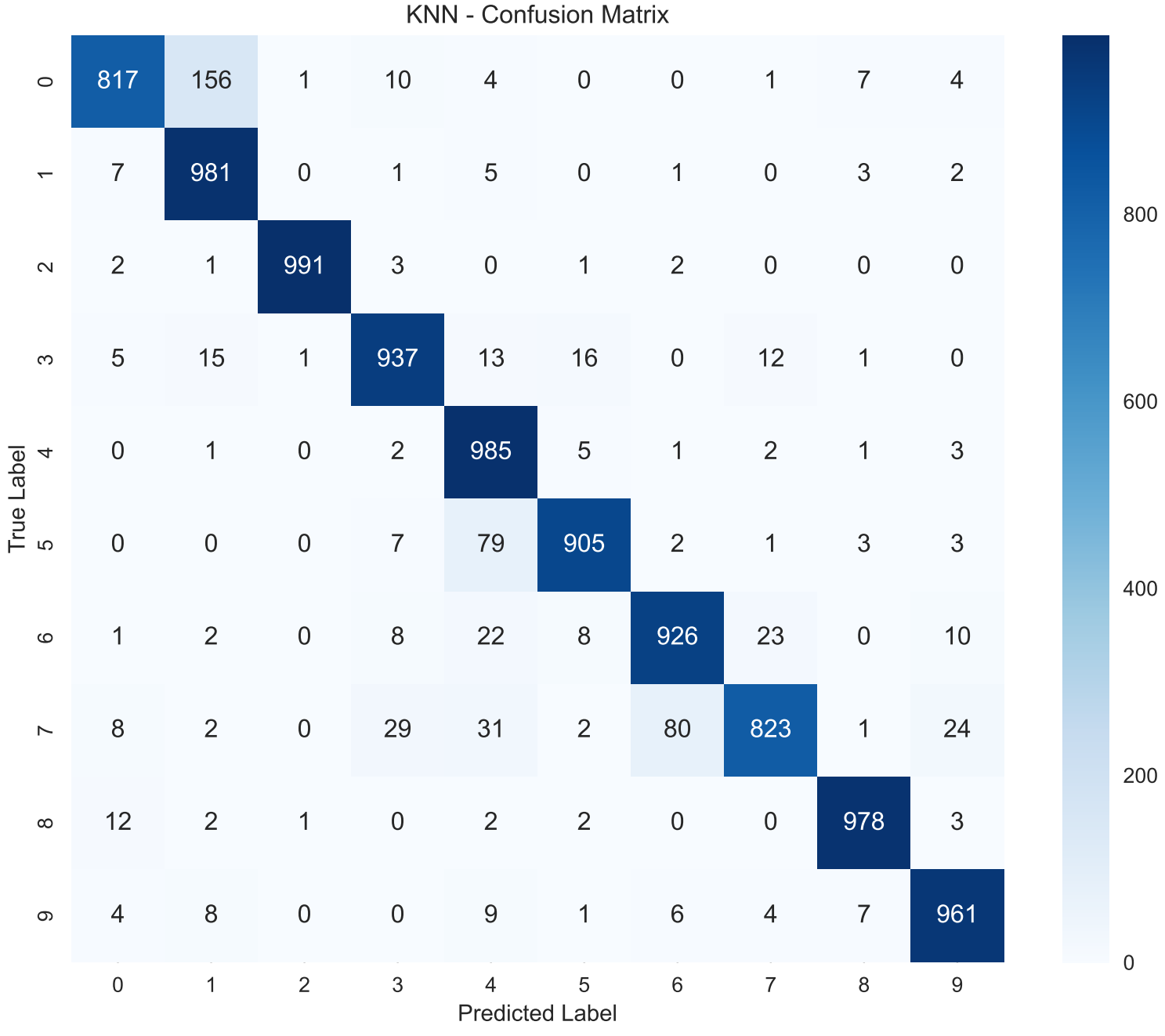

ROC Curves for RandomForestClassifier
True Positive Rate
False Positive Rate
0.0
0.2
0.4
0.6
0.8
1.0
ROC of class 0, AUC = 0.98
ROC of class 1, AUC = 0.99
ROC of class 2, AUC = 1.00
ROC of class 3, AUC = 1.00
ROC of class 4, AUC = 1.00
ROC of class 5, AUC = 0.99
ROC of class 6, AUC = 0.99
ROC of class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

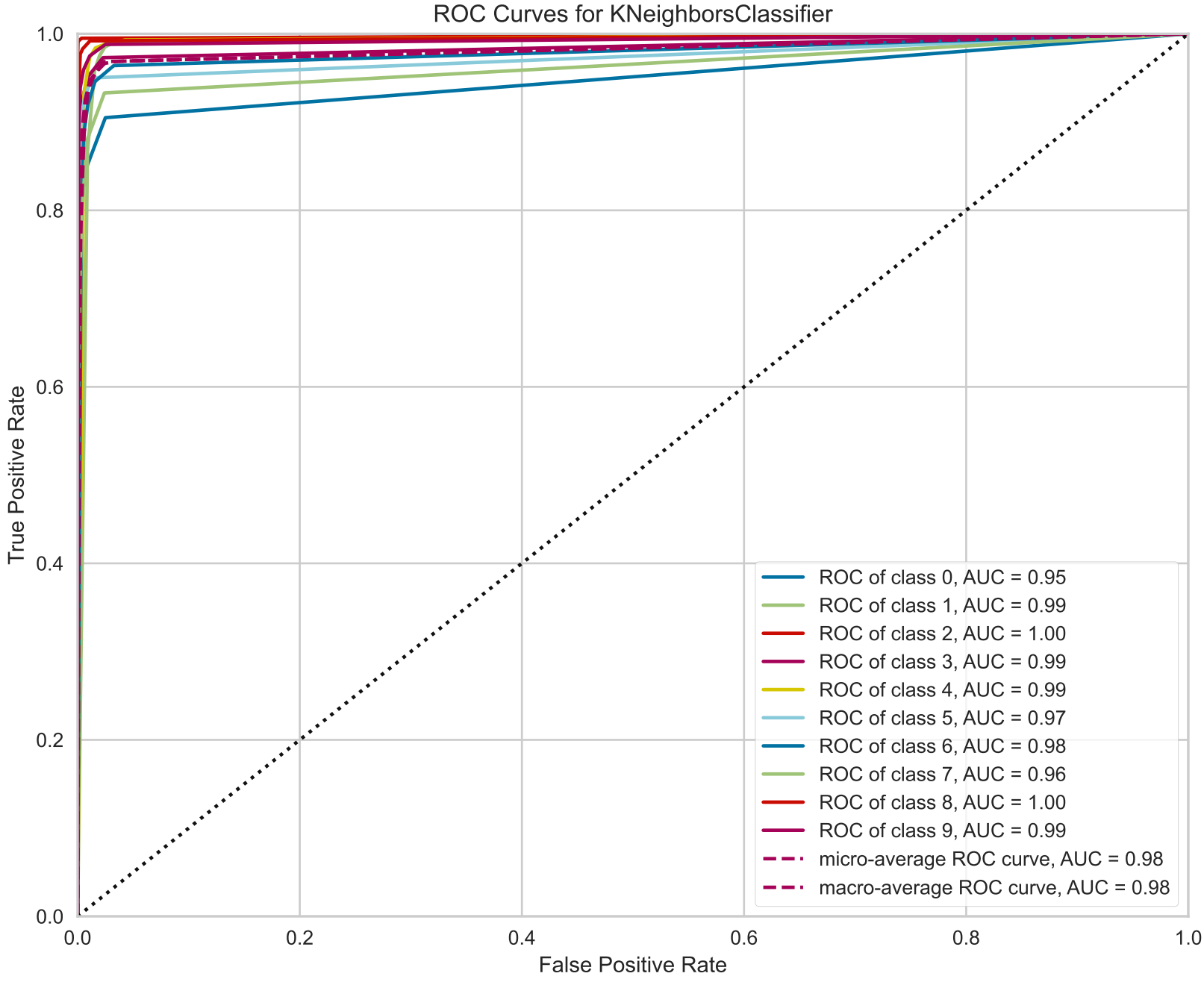

Model Metrics - Naive Bayes
1.0
0.8
0.6
0.4
0.2
0.0
Value
Precision
Recall
F1-Score
Metric

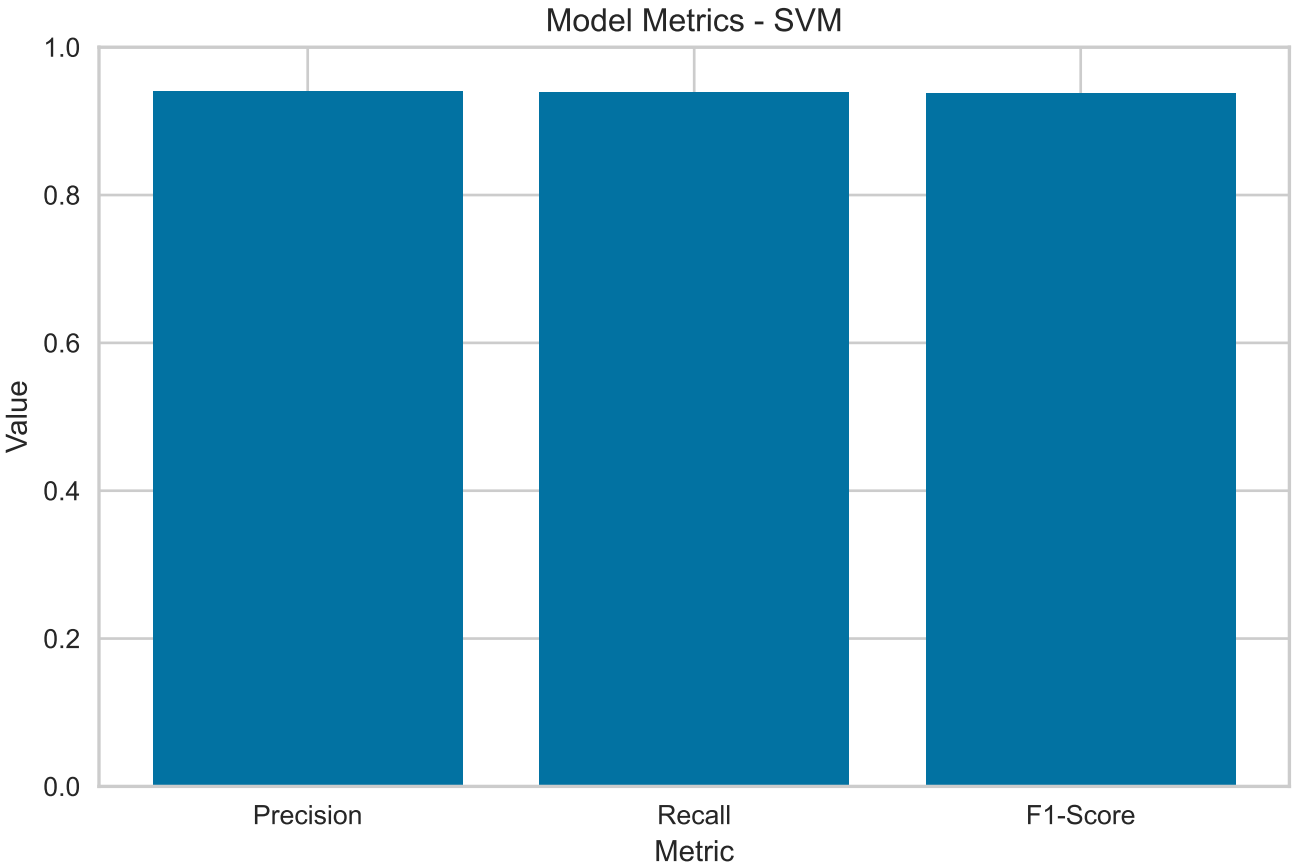

Naive Bayes - Confusion Matrix
True Label
Predicted Label
0 644 232 17 33 10 1 2 10 43 8
1 11 839 4 70 10 5 0 3 46 12
2 11 1 977 4 0 3 2 1 0 1
3 16 13 1 817 26 17 19 91 0 0
4 0 0 1 17 877 33 4 26 32 10
5 0 2 5 20 151 777 6 15 20 4
6 6 5 34 14 25 43 811 47 0 15
7 11 9 8 49 29 2 170 707 4 11
8 85 25 22 3 4 5 3 2 846 5
9 9 8 1 1 22 0 9 9 102 839
0 1 2 3 4 5 6 7 8 9
800
600
400
200
0

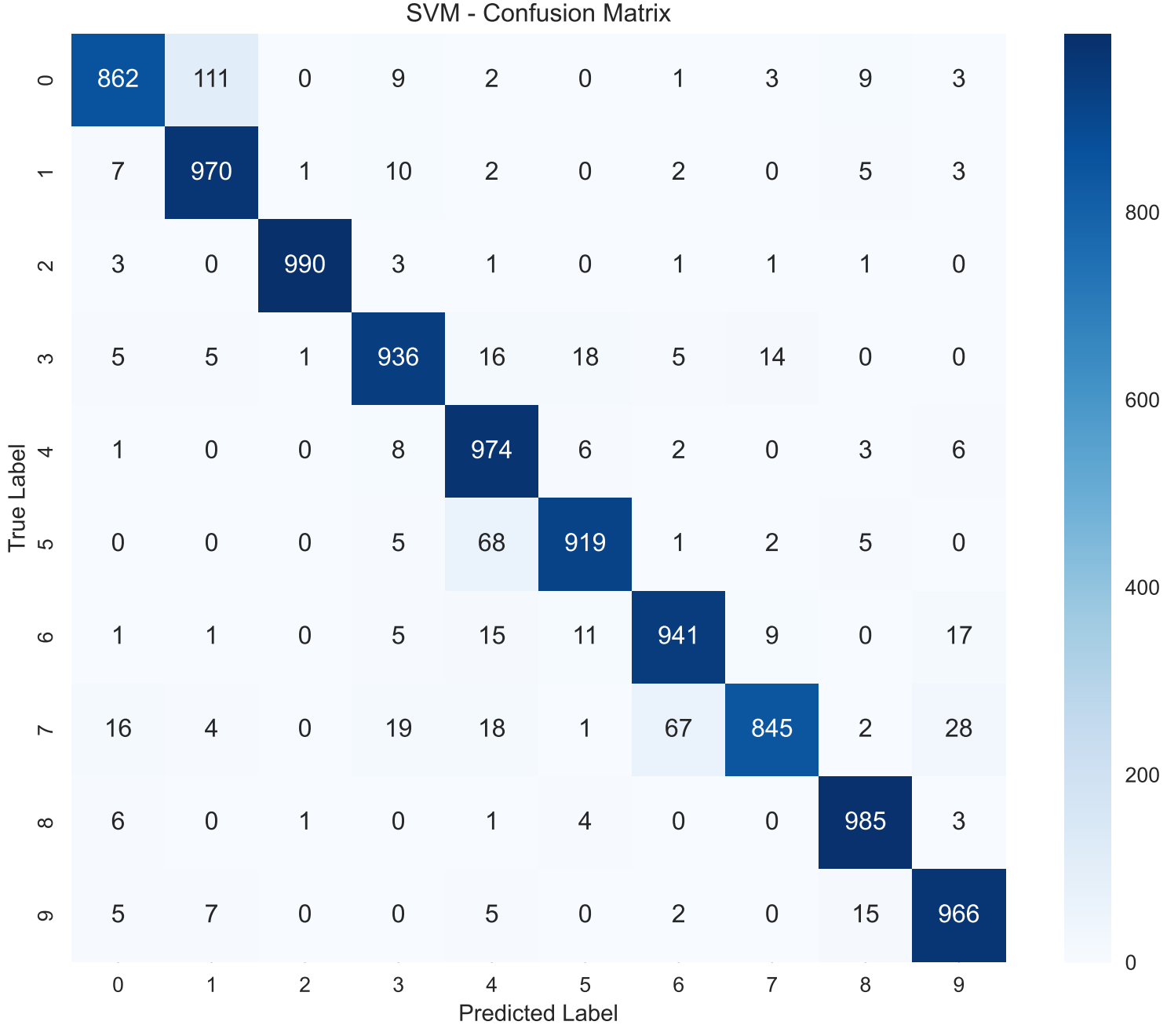

ROC Curves for GaussianNB
True Positive Rate
False Positive Rate
0.0
0.2
0.4
0.6
0.8
1.0
ROC of class 0, AUC = 0.96
ROC of class 1, AUC = 0.98
ROC of class 2, AUC = 1.00
ROC of class 3, AUC = 0.98
ROC of class 4, AUC = 0.98
ROC of class 5, AUC = 0.98
ROC of class 6, AUC = 0.98
ROC of class 7, AUC = 0.96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

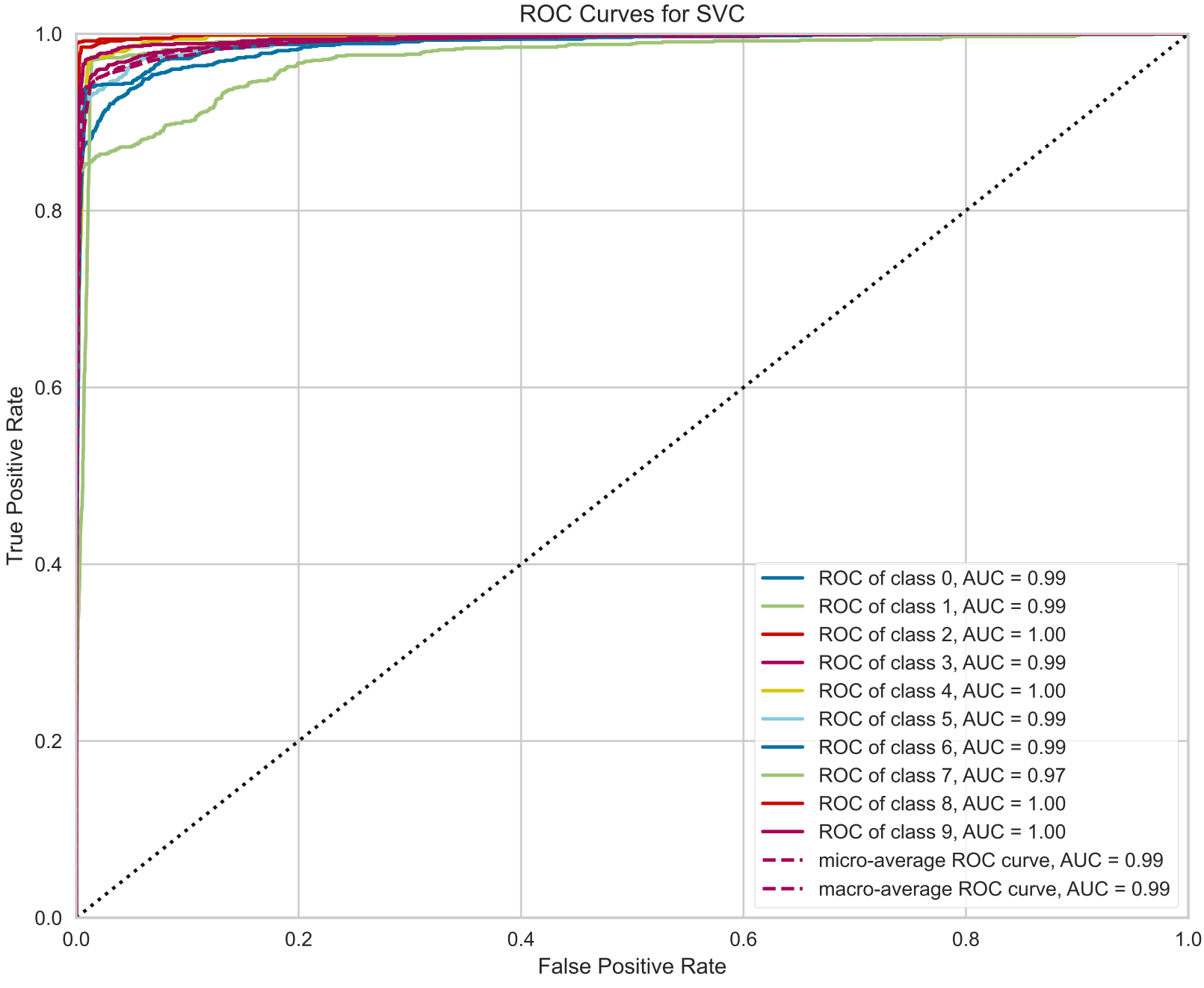

Model Metrics - KNN
1.0
0.8
0.6
0.4
0.2
0.0
Value
Precision
Recall
F1-Score
Metric


KNN - Confusion Matrix
True Label
Predicted Label
0 1 2 3 4 5 6 7 8 9
817 156 1 10 4 0 0 1 7 4
7 981 0 1 5 0 1 0 3 2
2 1 991 3 0 1 2 0 0 0
5 15 1 937 13 16 0 12 1 0
0 1 0 2 985 5 1 2 1 3
0 0 0 7 79 905 2 1 3 3
1 2 0 8 22 8 926 23 0 10
8 2 0 29 31 2 80 823 1 24
12 2 1 0 2 2 0 0 978 3
4 8 0 0 9 1 6 4 7 961
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 = 0.95
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 = 0.97
ROC of class 6, AUC = 0.98
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 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
862 111 0 9 2 0 1 3 9 3
7 970 1 10 2 0 2 0 5 3
3 0 990 3 1 0 1 1 1 0
5 5 1 936 16 18 5 14 0 0
1 0 0 8 974 6 2 0 3 6
0 0 0 5 68 919 1 2 5 0
1 1 0 5 15 11 941 9 0 17
16 4 0 19 18 1 67 845 2 28
6 0 1 0 1 4 0 0 985 3
5 7 0 0 5 0 2 0 15 966
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 = 0.99
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 = 1.00
ROC of class 5, AUC = 0.99
ROC of class 6, AUC = 0.99
ROC of class 7, AUC = 0.97
ROC of class 8, AUC = 1.00
ROC of class 9, AUC = 1.00
micro-average ROC curve, AUC = 0.99
macro-average ROC curve, AUC = 0.99

Model Comparison - PCA 30 components

Model	Precision	Recall	F1-Score
Decision Trees	0.8074335443427711	0.8078	0.806773130012807
Random Forest	0.9067508701567825	0.9039999999999999	0.9034070387208256
Naive Bayes	0.8164343421692013	0.8134	0.8122380147048691
KNN	0.9338906823829006	0.9304	0.9300599035679407
SVM	0.9404738030841935	0.9388	0.9385014105497413