

Model Comparison Report

Date: 03/07/2025 19:14:25

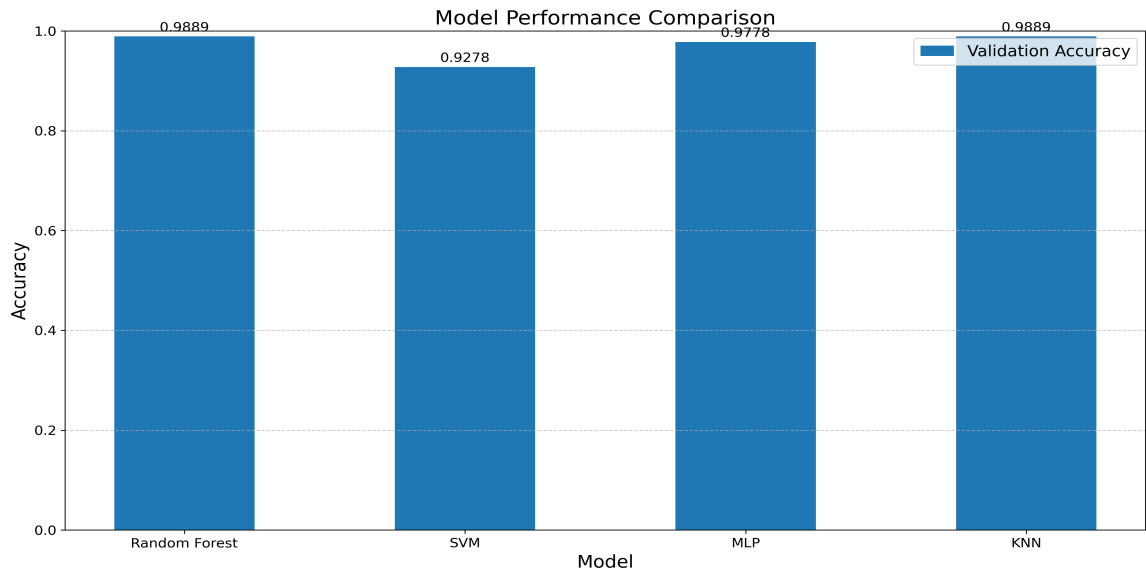
Dataset Information

Training dataset: gradient_augmented_eng.csv
Validation dataset: gradient_eng.csv

Results Summary

Model	Validation Accuracy
Random Forest	0.9889
SVM	0.9278
MLP	0.9778
KNN	0.9889

Performance Comparison

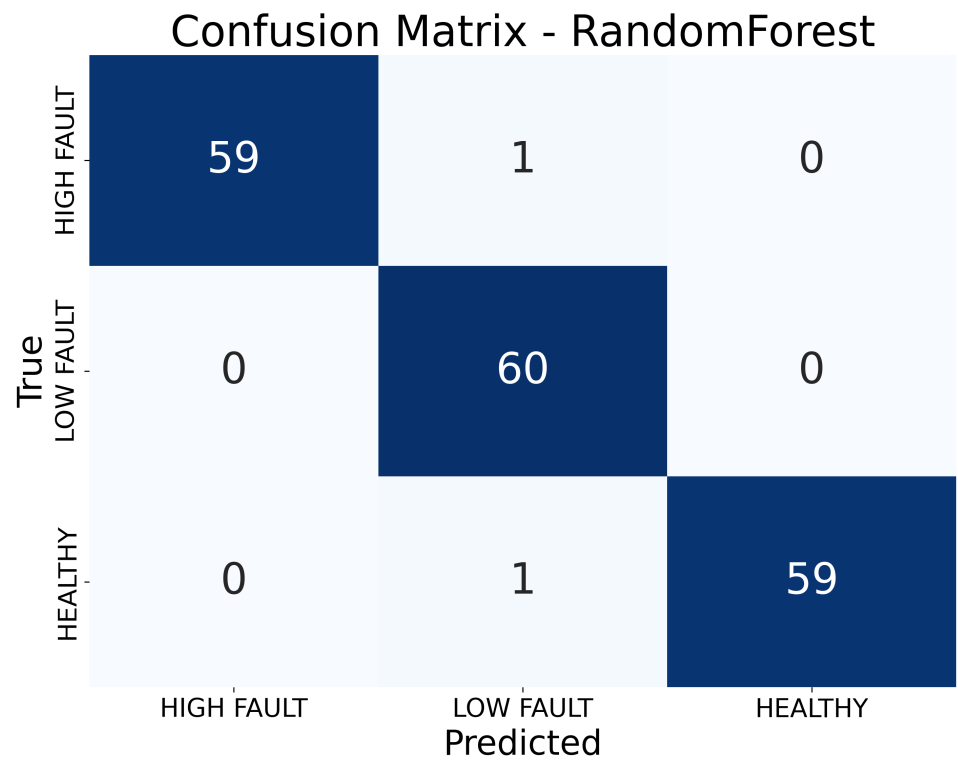


Model Details: Random Forest

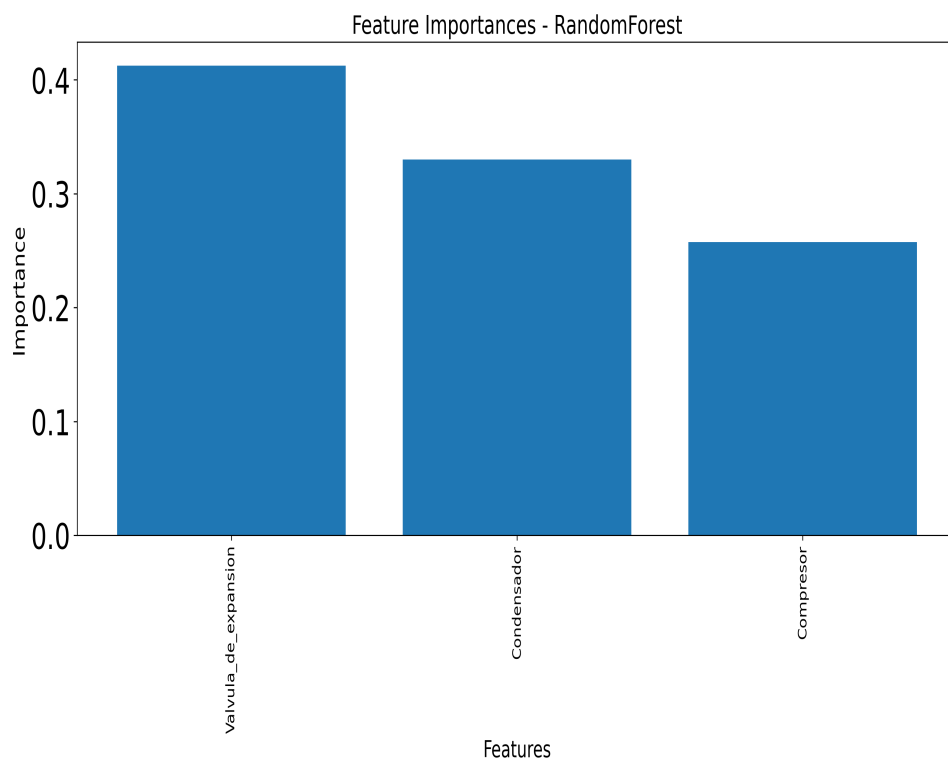
Evaluation Metrics:

Class	Precision	Recall	F1-Score	Support
HIGH FAULT	1.0000	0.9833	0.9916	60.0
LOW FAULT	0.9677	1.0000	0.9836	60.0
HEALTHY	1.0000	0.9833	0.9916	60.0
macro avg	0.9892	0.9889	0.9889	180.0
weighted avg	0.9892	0.9889	0.9889	180.0

Confusion Matrix:



Feature Importance:

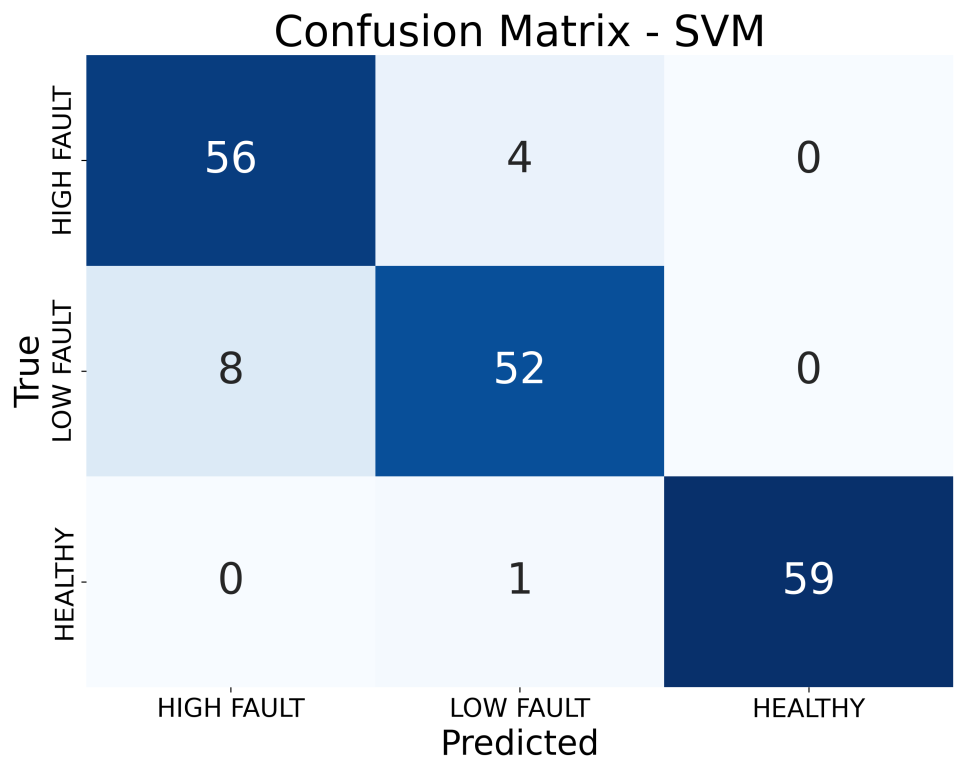


Model Details: SVM

Evaluation Metrics:

Class	Precision	Recall	F1-Score	Support
HIGH FAULT	0.8750	0.9333	0.9032	60.0
LOW FAULT	0.9123	0.8667	0.8889	60.0
HEALTHY	1.0000	0.9833	0.9916	60.0
macro avg	0.9291	0.9278	0.9279	180.0
weighted avg	0.9291	0.9278	0.9279	180.0

Confusion Matrix:

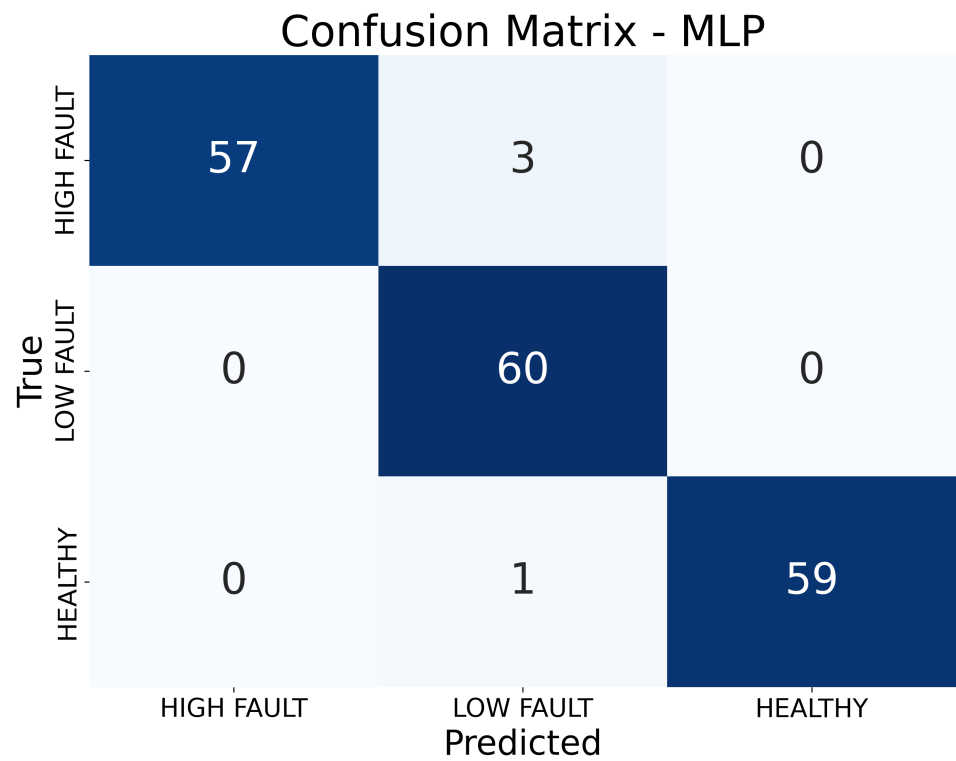


Model Details: MLP

Evaluation Metrics:

Class	Precision	Recall	F1-Score	Support
HIGH FAULT	1.0000	0.9500	0.9744	60.0
LOW FAULT	0.9375	1.0000	0.9677	60.0
HEALTHY	1.0000	0.9833	0.9916	60.0
macro avg	0.9792	0.9778	0.9779	180.0
weighted avg	0.9792	0.9778	0.9779	180.0

Confusion Matrix:

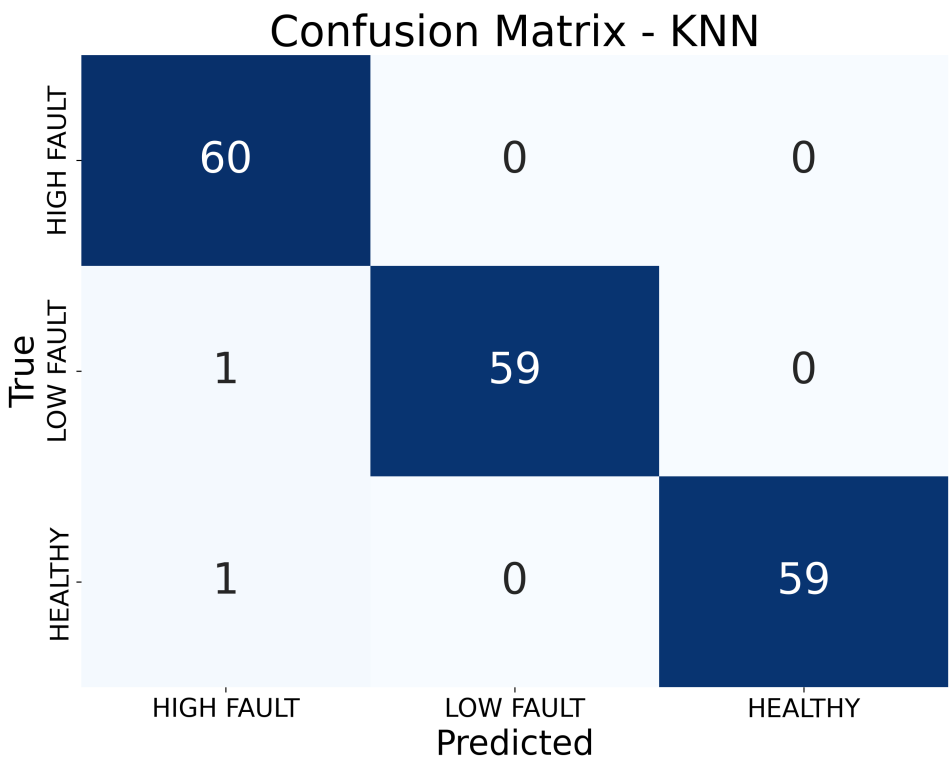


Model Details: KNN

Evaluation Metrics:

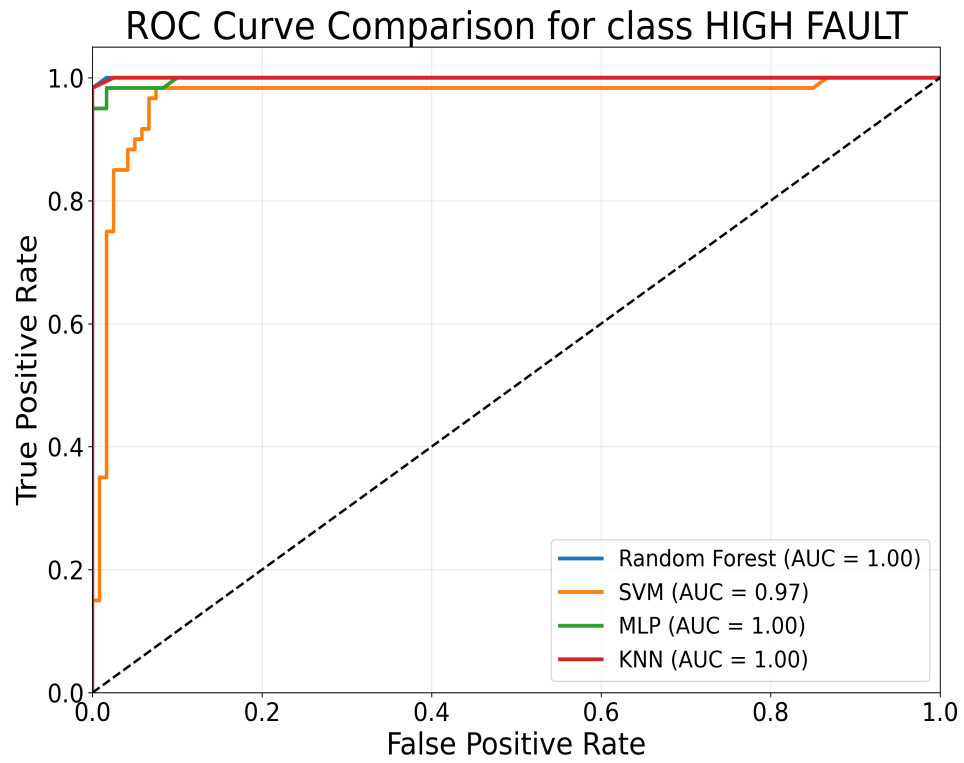
Class	Precision	Recall	F1-Score	Support
HIGH FAULT	0.9677	1.0000	0.9836	60.0
LOW FAULT	1.0000	0.9833	0.9916	60.0
HEALTHY	1.0000	0.9833	0.9916	60.0
macro avg	0.9892	0.9889	0.9889	180.0
weighted avg	0.9892	0.9889	0.9889	180.0

Confusion Matrix:

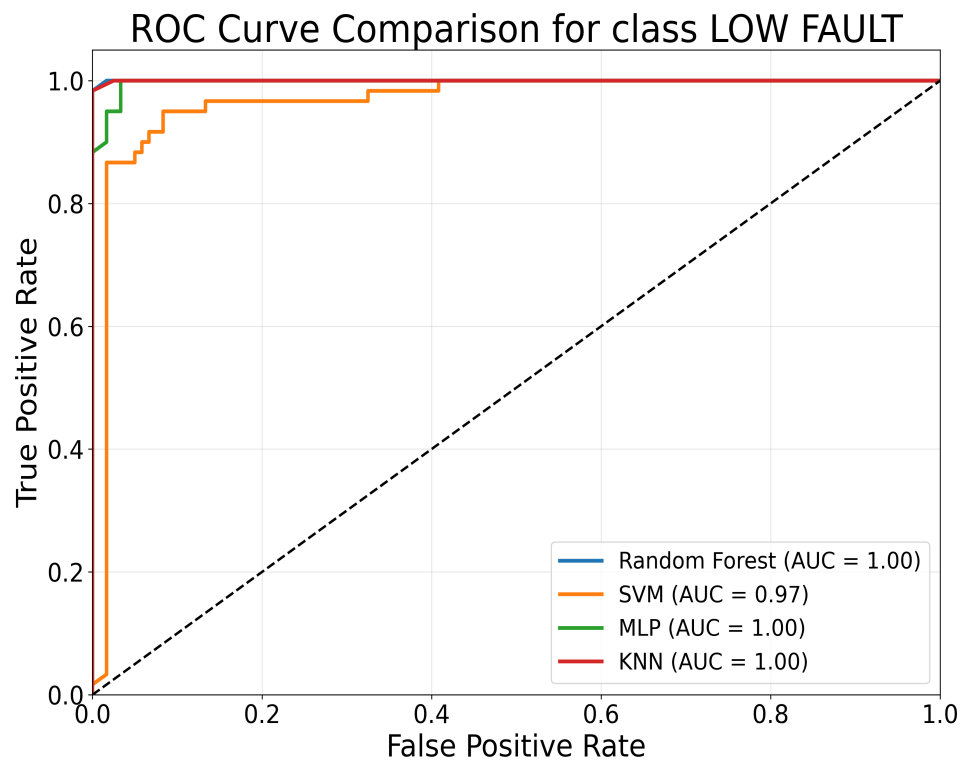


ROC Curves by Class

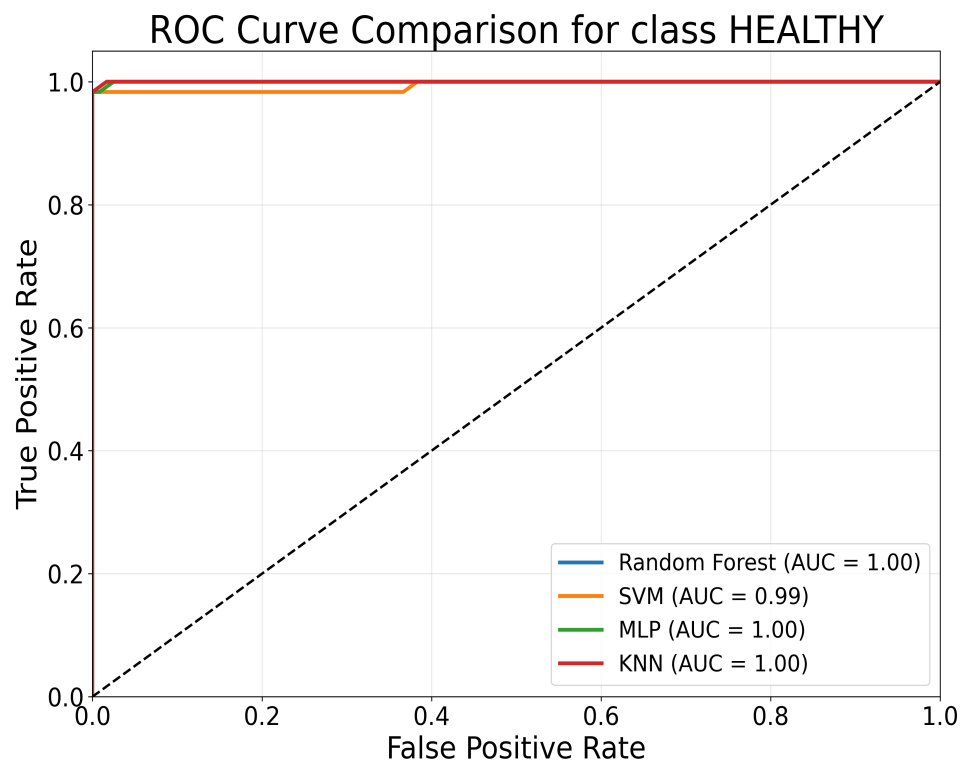
Class 0:



Class 1:



Class 2:



Conclusions

Based on the results, the best performing model is Random Forest with an accuracy of 0.9889 on the validation set.