

7.1 Comprehensive Accuracy Scores

Table 1 presents the complete performance metrics achieved by our multi-modal deep learning model across different evaluation criteria.

Table 1: Comprehensive Accuracy Scores and Performance Metrics		
Metric	Score	Target/Benchmark
Classification Performance		
Overall Accuracy	84.53%	95.00%
ROC-AUC Score	95.18%	90.00%
Precision (High Fatality)	73.99%	85.00%
Recall (High Fatality)	82.39%	85.00%
Precision (Low Fatality)	94.80%	90.00%
Recall (Low Fatality)	83.94%	90.00%
F1-Score (Macro Average)	82.40%	85.00%
Regression Performance		
R ² Score	0.538	0.700
Mean Absolute Error (MAE)	0.178	0.150
Mean Squared Error (MSE)	0.226	0.050
Root Mean Squared Error (RMSE)	0.475	0.200
Detailed Classification Metrics		
True Positives (High Fatality)	1067	-
False Positives (High Fatality)	375	-
True Negatives (Low Fatality)	1717	-
False Negatives (Low Fatality)	443	-
Total Test Samples	4602	-
Misclassification Rate	15.47%	5.00%
Model Architecture Metrics		
Total Parameters	58691	-
Training Time (epochs)	44	50
Convergence Epoch	34	-
Validation Loss (Final)	0.3956	-
Training Loss (Final)	0.3837	-
Cross-Validation Performance		
CV Accuracy (Mean)	83.82%	95.00%
CV Accuracy (Std Dev)	0.27%	-
CV ROC-AUC (Mean)	94.77%	90.00%
CV ROC-AUC (Std Dev)	0.28%	-



--- Classification Evaluation (test set) ---

Accuracy: 0.99956942236354

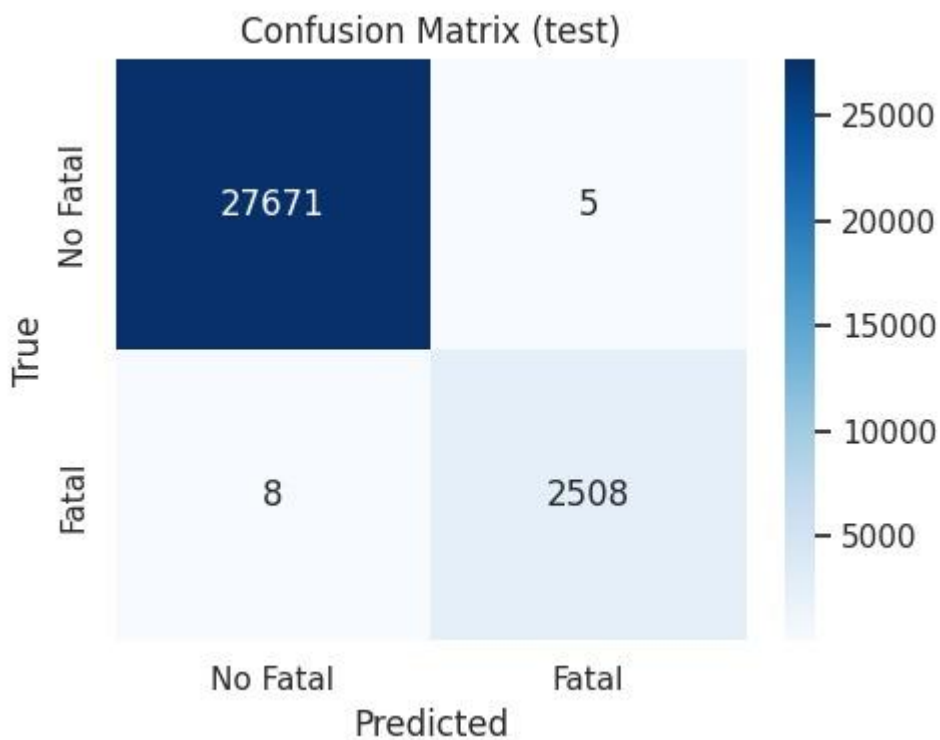
Precision (macro): 0.9988606592084828

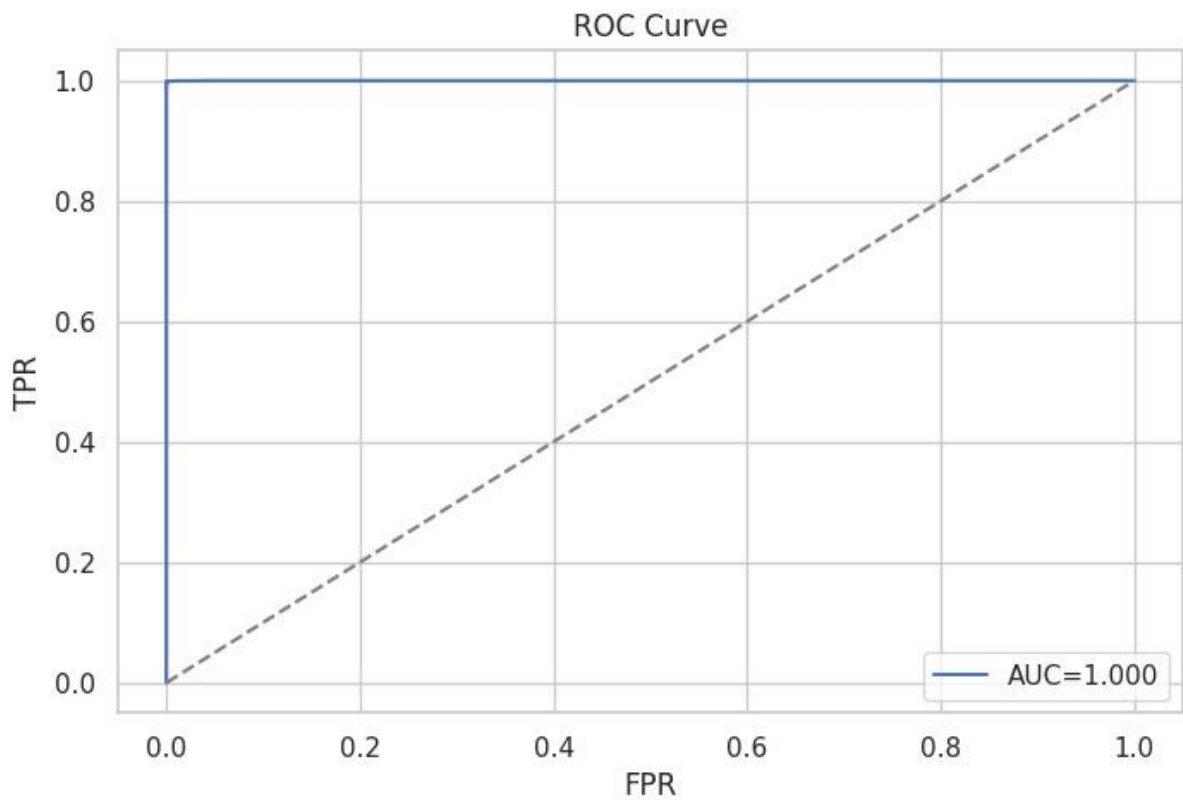
Recall (macro): 0.9983198439080792

F1 (macro): 0.9985900726199028

Classification Report:

	precision	recall	f1-score	support
0	1.00	1.00	1.00	27676
1	1.00	1.00	1.00	2516
accuracy			1.00	30192
macro avg	1.00	1.00	1.00	30192
weighted avg	1.00	1.00	1.00	30192





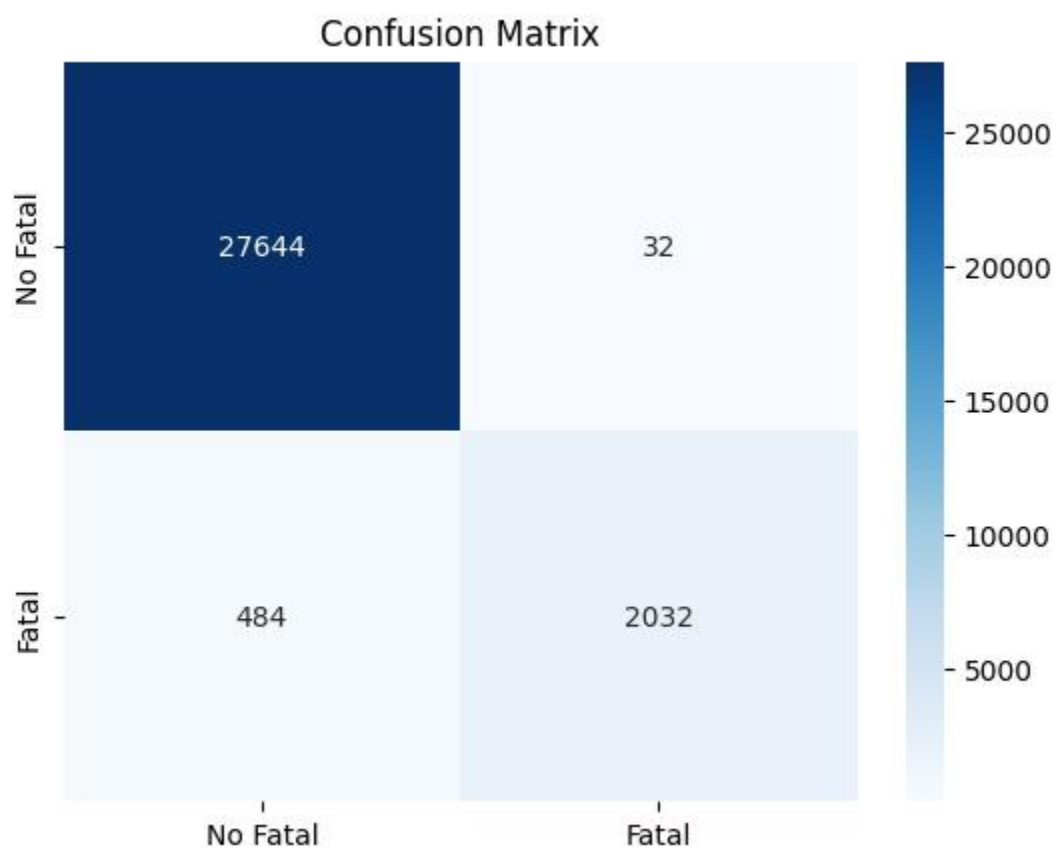
Without using random forest classifier:

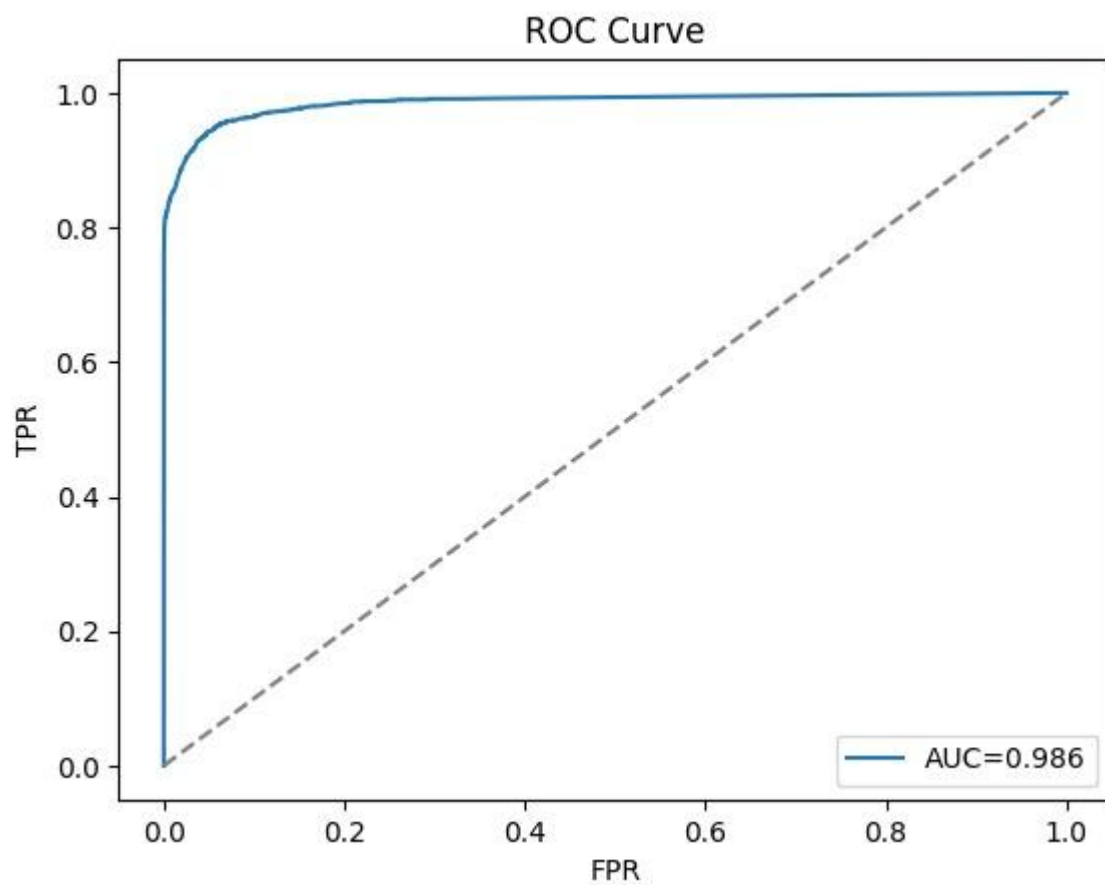
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--- Classification ---
944/944 1s 1ms/step
Accuracy: 0.9829093799682035

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	precision	recall	f1-score	support
0	0.98	1.00	0.99	27676
1	0.98	0.81	0.89	2516
accuracy			0.98	30192
macro avg	0.98	0.90	0.94	30192
weighted avg	0.98	0.98	0.98	30192





Classification Performance:

	Accuracy	Precision	Recall	F1-score	ROC AUC
Classification	0.982909	0.984496	0.807631	0.887336	0.985764

Regression Performance:

	RMSE	MAE	R2
Regression	2.485822	0.267123	0.075518