Spam Detection Model Performance Report

Executive Summary

Test Overview:
• Models Tested: Enhanced Transformer, SVM, CatBoost
• SPAM Categories: 5
• HAM Categories: 5
• Examples per Category: 5
• Total Tests: 50 per model

This report analyzes spam detection model performance across diverse content types.

Overall Performance Summary

Model	Overall Accuracy	SPAM Detection	HAM Detection	Perfect Categories
Enhanced Transformer	76.0%	96.0%	56.0%	4
SVM	80.0%	96.0%	64.0%	4
CatBoost	62.0%	56.0%	68.0%	0

Enhanced Transformer - Detailed Analysis

Performance Level	Categories	Count
Perfect (100%)	Financial Scams, Product Promotion, Romance/Dating, Health/Medical	4
Excellent (95-99%)	None	0
Good (85-94%)	None	0
Okay (70-84%)	Phishing, Banking Legitimate	2
Poor (<70%)	Business Professional, Personal Communication, E-commerce Legitimate, Educational	4

Category-wise Performance

Category	Type	Accuracy	Correct/Total
Financial Scams	SPAM	100.0%	5/5
Phishing	SPAM	80.0%	4/5
Product Promotion	SPAM	100.0%	5/5
Romance/Dating	SPAM	100.0%	5/5
Health/Medical	SPAM	100.0%	5/5
Banking Legitimate	HAM	80.0%	4/5
Business Professional	HAM	60.0%	3/5
Personal Communication	HAM	60.0%	3/5
E-commerce Legitimate	HAM	20.0%	1/5
Educational	HAM	60.0%	3/5

SVM - Detailed Analysis

Performance Level	Categories	Count
Perfect (100%)	Financial Scams, Phishing, Product Promotion, Romance/Dating	4
Excellent (95-99%)	None	0
Good (85-94%)	None	0
Okay (70-84%)	Health/Medical, Business Professional, Personal Communication, Educational	4
Poor (<70%)	Banking Legitimate, E-commerce Legitimate	2

Category-wise Performance

Category	Type	Accuracy	Correct/Total
Financial Scams	SPAM	100.0%	5/5
Phishing	SPAM	100.0%	5/5
Product Promotion	SPAM	100.0%	5/5
Romance/Dating	SPAM	100.0%	5/5
Health/Medical	SPAM	80.0%	4/5
Banking Legitimate	HAM	20.0%	1/5
Business Professional	HAM	80.0%	4/5
Personal Communication	HAM	80.0%	4/5
E-commerce Legitimate	HAM	60.0%	3/5
Educational	HAM	80.0%	4/5

CatBoost - Detailed Analysis

Performance Level	Categories	Count
Perfect (100%)	None	0
Excellent (95-99%)	None	0
Good (85-94%)	None	0
Okay (70-84%)	Product Promotion, Business Professional, Personal Communication, Educational	4
Poor (<70%)	Financial Scams, Phishing, Romance/Dating, Health/Medical, Banking Legitimate, E-comm	6

Category-wise Performance

Category	Type	Accuracy	Correct/Total
Financial Scams	SPAM	60.0%	3/5
Phishing	SPAM	60.0%	3/5
Product Promotion	SPAM	80.0%	4/5
Romance/Dating	SPAM	60.0%	3/5
Health/Medical	SPAM	20.0%	1/5
Banking Legitimate	HAM	40.0%	2/5
Business Professional	HAM	80.0%	4/5
Personal Communication	HAM	80.0%	4/5
E-commerce Legitimate	HAM	60.0%	3/5
Educational	HAM	80.0%	4/5

Recommendations & Conclusions

Key Findings:
• Best Overall Performance: **SVM** (80.0% accuracy)
• Best SPAM Detection: **Enhanced Transformer** (96.0% accuracy)
• Best HAM Detection: **CatBoost** (68.0% accuracy)

Usage Recommendations:
• For maximum spam detection: Use **Enhanced Transformer**
• For protecting legitimate emails: Use **CatBoost**
• For balanced performance: Use **SVM**