4. PROJECT DESIGN

4.1 Problem Solution Fit

Using machine learning to detect phishing emails reduces **false positives** and enhances **cybersecurity** by adapting to new threats.

4.2 Proposed Solution

A **machine learning-based classifier** that extracts features from emails and predicts their legitimacy.

4.3 Solution Architecture

1. **Data Collection**
2. **Feature Engineering**
3. **Model Training & Evaluation**
4. **Deployment & Alert System**

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5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

Timelines for data collection, preprocessing, model training, and evaluation.

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6. FUNCTIONAL AND PERFORMANCE TESTING

6.1 Performance Testing

Models are evaluated using:

- **Accuracy**
- **Precision**
- **Recall**
- **F1-score**

```python
# Evaluate the model
print(confusion_matrix(y_test, y_pred))
print(classification_report(y_test, y_pred))
print("Accuracy:", accuracy_score(y_test, y_pred))
```

```
[[5 0]
 [0 5]]
              precision    recall  f1-score   support

           0       1.00      1.00      1.00         5
           1       1.00      1.00      1.00         5

    accuracy                           1.00        10
   macro avg       1.00      1.00      1.00        10
weighted avg       1.00      1.00      1.00        10

Accuracy: 1.0
```

Evaluating accuracy, precision, recall, and F1-score for various ML models.
