Dataset Overview

The ISOT Fake News Dataset was utilized to train and evaluate the models. The dataset is comprised of two classes: **Real-News** and **Fake-News**. Below is a detailed breakdown of the dataset:

Type	Articles	Subjects (Number of Articles)
Real-News	21,417	**World-News:** 10,145 **Politics-News:** 11,272
Fake-News	23,481	**Government News:** 1,570 **Middle-East:** 778 **US News:** 783 **Left-News:** 4,459 **Politics News:** 6,841 **General News:** 9,050

Total Dataset Size: **44,898 Articles**

Models Trained

Four models were trained and evaluated:

1. Logistic Regression
2. LSTM (Long Short-Term Memory Neural Network)
3. BERT (Bidirectional Encoder Representations from Transformers)
4. RoBERTa (Robustly Optimized BERT Approach)

Logistic Regression and LSTM Results

Logistic Regression Results

- **Training Accuracy:** 96.91%
- **Testing Accuracy:** 96.27%

Classification Report (Logistic Regression):

Class	Precision	Recall	F1-Score	Support
0	0.97	0.95	0.96	11,340
1	0.96	0.97	0.96	12,059

- **Overall Accuracy:** 96%
- **Macro Avg F1-Score:** 0.96
- **Weighted Avg F1-Score:** 0.96

LSTM Results

- **Training Accuracy:** Not explicitly reported
- **Testing Accuracy:** 97%

Classification Report (LSTM):

Class	Precision	Recall	F1-Score	Support
0	0.98	0.95	0.97	11,340
1	0.95	0.99	0.97	12,059

- **Overall Accuracy:** 97%
- **Macro Avg F1-Score:** 0.97
- **Weighted Avg F1-Score:** 0.97

BERT and RoBERTa Results

BERT Results

- **Evaluation Loss:** 0.031
- **Evaluation Accuracy:** 99.55%
- **Precision:** 99.62%
- **Recall:** 99.50%
- **F1-Score:** 99.56%

Classification Report (BERT):

Class	Precision	Recall	F1-Score	Support
Real	0.99	1.00	1.00	7,010
Fake	1.00	1.00	1.00	7,409

- **Overall Accuracy:** 99.55%
- **Macro Avg F1-Score:** 1.00
- **Weighted Avg F1-Score:** 1.00

RoBERTa Results

- **Evaluation Accuracy:** 100%
- **Precision:** 100%
- **Recall:** 100%
- **F1-Score:** 100%

Classification Report (RoBERTa):

Class	Precision	Recall	F1-Score	Support
Fake	1.00	1.00	1.00	23,481
Real	1.00	1.00	1.00	21,417

- **Overall Accuracy:** 100%
- **Macro Avg F1-Score:** 1.00
- **Weighted Avg F1-Score:** 1.00

Model Comparison

Model	Training Accuracy	Testing Accuracy	F1-Score
Logistic Regression	96.91%	96.27%	96%
LSTM	-	97%	97%
BERT	-	99.55%	99.56%
RoBERTa	-	100%	100%