


FAKE NEWS DETECTION IN TELUGU LANGUAGE

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PROBLEM STATEMENT

- **In low-resource languages like Telugu, detecting fake news is tough due to a lack of labeled data, this research focuses on using models like mBERT, XLM-RoBERTa, IndicBERT, and MuRIL to classify fake news in Telugu language**
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OBJECTIVES

- To collect data from various trusted websites.
- To perform data cleaning and preprocessing.
- To fine-tune the model on different pretrained model.
- Comparison and Evaluation models.

WEB SCRAPING

- Scrapes a Telugu fact-checking website (<https://factly.in/category/telugu/>) to extract claims, facts, fact-checks, reviewer information, and publication date.
- Fetches the webpage using requests.
- Parses the HTML content with BeautifulSoup.
- Iterates through relevant sections:
 - Extracts claims, facts, and fact-checks based on specific HTML patterns (e.g., number of <p> and tags).
 - Gathers reviewer information and publication date/time.
- Writes the extracted data to a CSV file (output.csv).

DATASET

Collected data from trusted websites.

- **Fake News - Factly.in**
- **Facts - HindustanTimes Telugu**




Classes in Dataset:

- నిజం - **Not Fake**
- తప్పు - **Fake**
- తప్పుదోవ - **Misleading**



DATASET

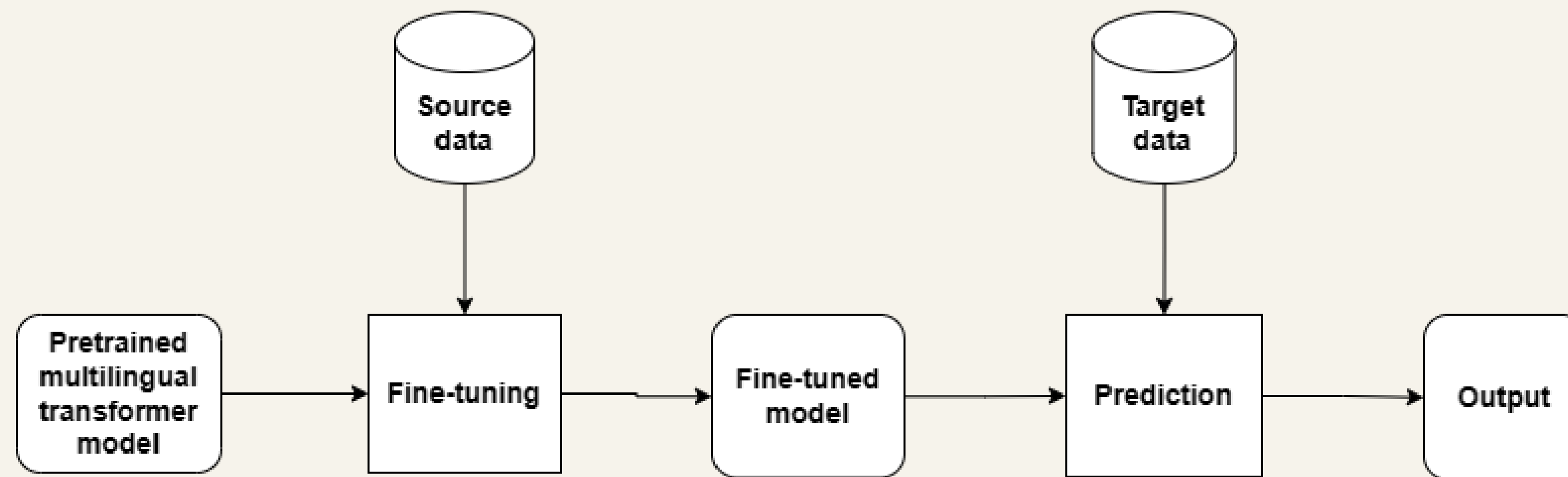
Attributes in dataset:

- News
 - Explanation/Description
 - Class
 - Reviewer/ Author
 - Date(YYYY-MM-DD)
 - Time
- 
- 
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Samples from dataset:

Claim	Fact	Fact-check	Reviewer	Date(YYYY-MM-DD)	Time
కమ్యూనిస్టు నేతగా ఇదివరకు జీవితాన్ని గడిపిన వి. ఎస్. అచ్యుతానందన్, ప్రస్తుతం నుదుటిపై తిలకం పెట్టుకొని దేవాలయాలను సందర్శిస్తున్నారు, దానికి సంబంధించిన ఫోటో.	ఈ ఫోటో మార్ఫ్ చేయబడినది. అసలు ఫోటోలో వి.ఎస్.అచ్యుతానందన్ నూదిటిపై తిలకం లేదు.	తప్పు	Dilip Kumar Sripada	2023-11-17	13:16:09
ట్విటర్లో ఉద్యోగాల కోత మొదలైంది. సగం మంది ఉద్యోగులు ఇక ఇంటి దారి పట్టాల్సిందేనని ట్వీటర్ ఈరాత్రికి హెచ్చరించనుంది.	ట్విటర్లో ఉద్యోగాల కోత మొదలైంది. ఉద్యోగం ఊడితే ఆ సంగతి తెలుపుతూ ఆయా ఉద్యోగులకు కంపెనీ ఈమెయిల్ ద్వారా ఆ సంగతి తెలపనుంది.	నిజం	HT Telugu Desk	2022-11-04	11:29:00
ఇటీవల నల్లమల్ల అడవుల్లో తవ్వకాల్లో బయటపడిన శివలింగం యొక్క ఫోటో.	వాస్తవానికి ఈ శివలింగం జూన్ 2013లో అప్పటి నల్గొండ (ఇప్పుడు యాదాద్రి భువనగిరి) జిల్లాలో ఉన్న రాచకొండ కోట పరిసరాల్లో జరిగిన తవ్వకాల్లో బయటపడింది. ఇది రాచకొండ అటవీ ప్రాంతంలో ఉంది.	తప్పుదోవ	Varun Borugadda	2023-09-14	18:07:30

METHODOLOGY



RESULT

PERFORMANCE METRICS OF MODELS

Epochs	mBERT	XLNet-Roberta
3	95.37	94.29
5	92.74	95.67

- Considered column “Claim” as input to the model.
- Considered “తప్పుదోవ” / “Misleading” as “తప్పు”/ “Fake” and trained on 2 labels

RESULT

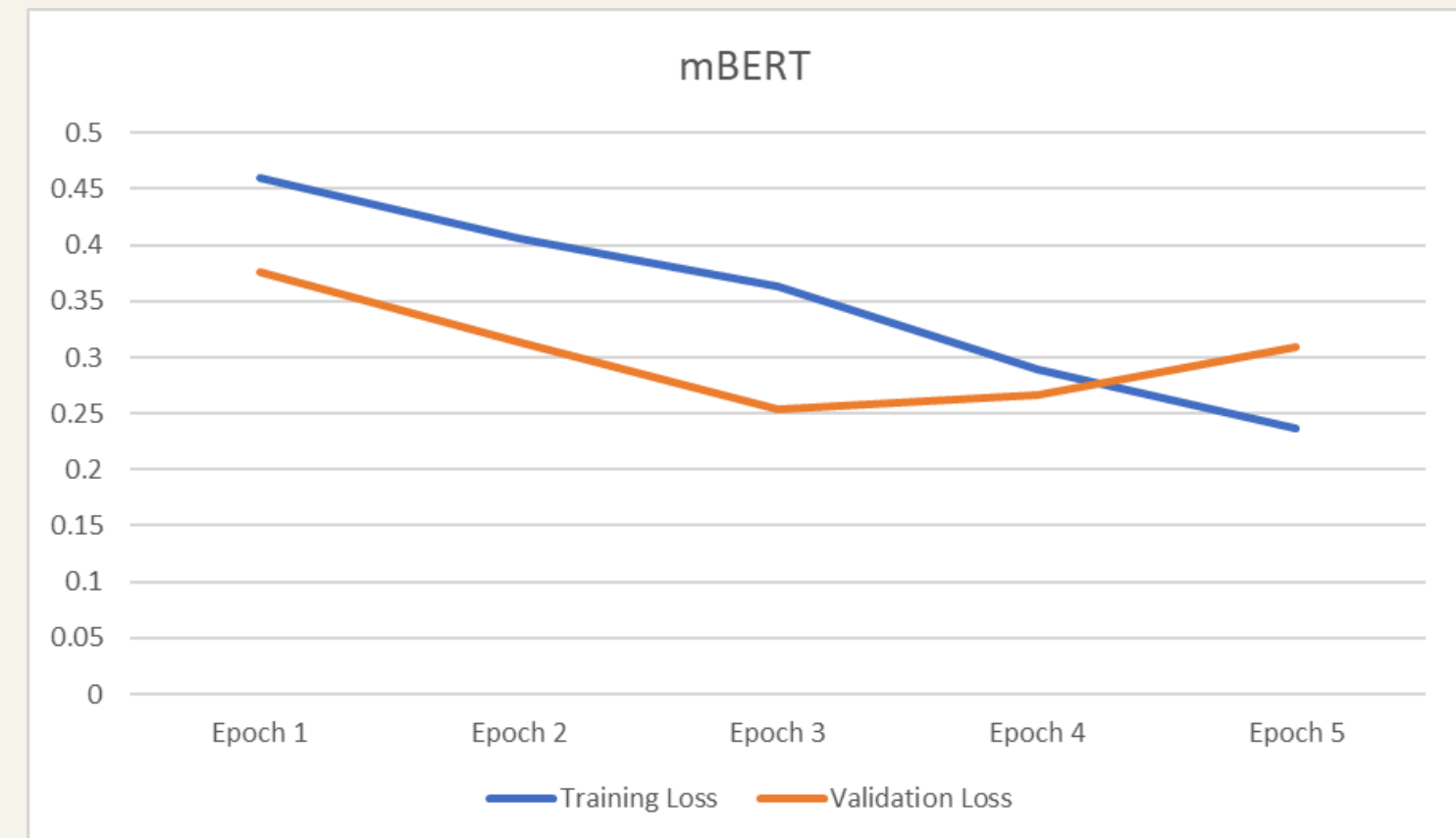
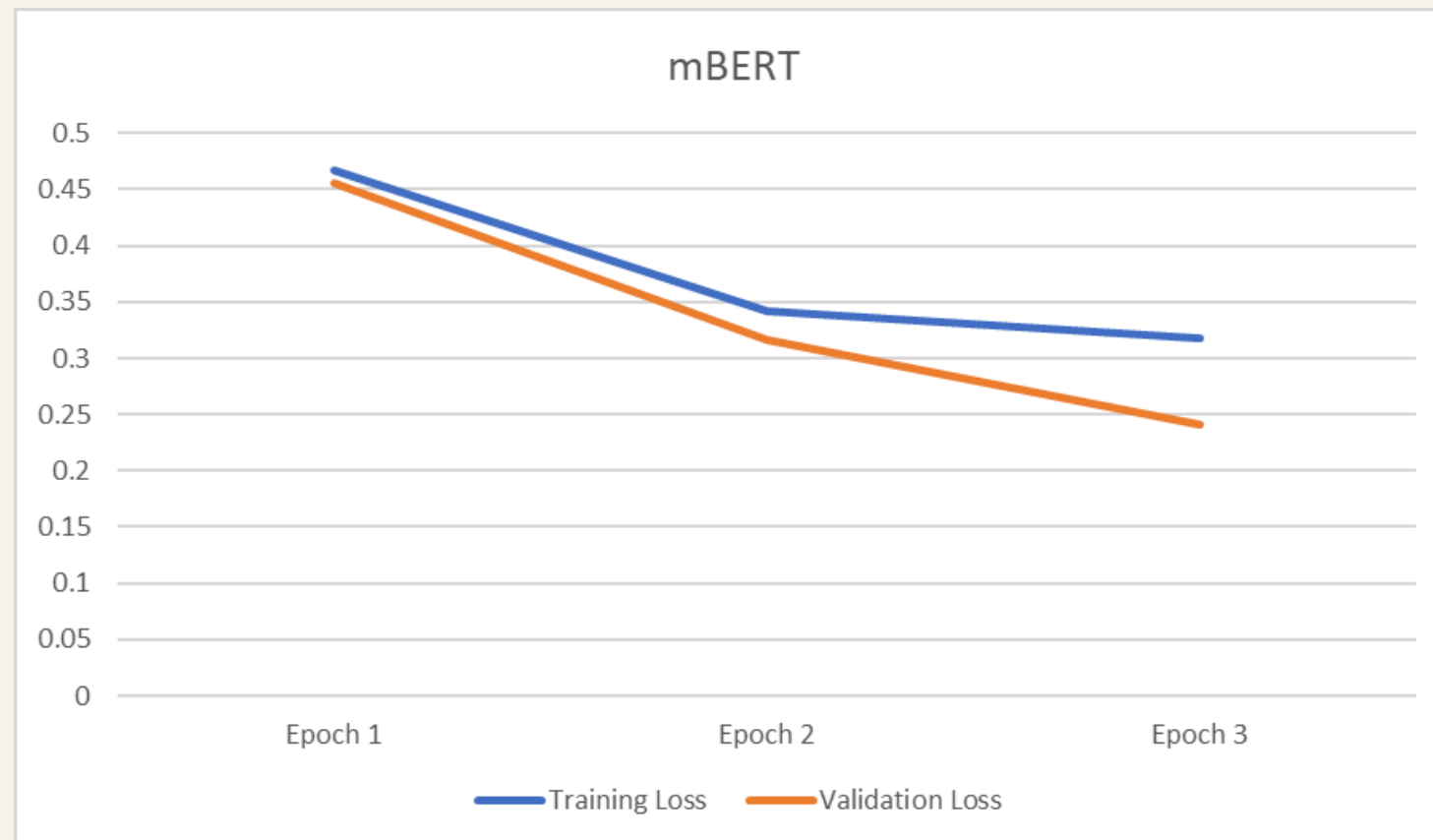
PERFORMANCE METRICS OF MODELS

	3 Epoch		5 Epoch	
Model	Accuracy	F1-Score	Accuracy	F1-Score
mBERT	88.79	87.90	87.69	86.42
XLM-RoBERTa	85.93	85.13	86.37	83.83
IndicBERT	81.31	80.10	86.81	86.71
MuRIL	88.79	88.57	87.25	84.81

- Considered columns “Claim” and “Fact” as input to the model.
- Trained on 3 labels

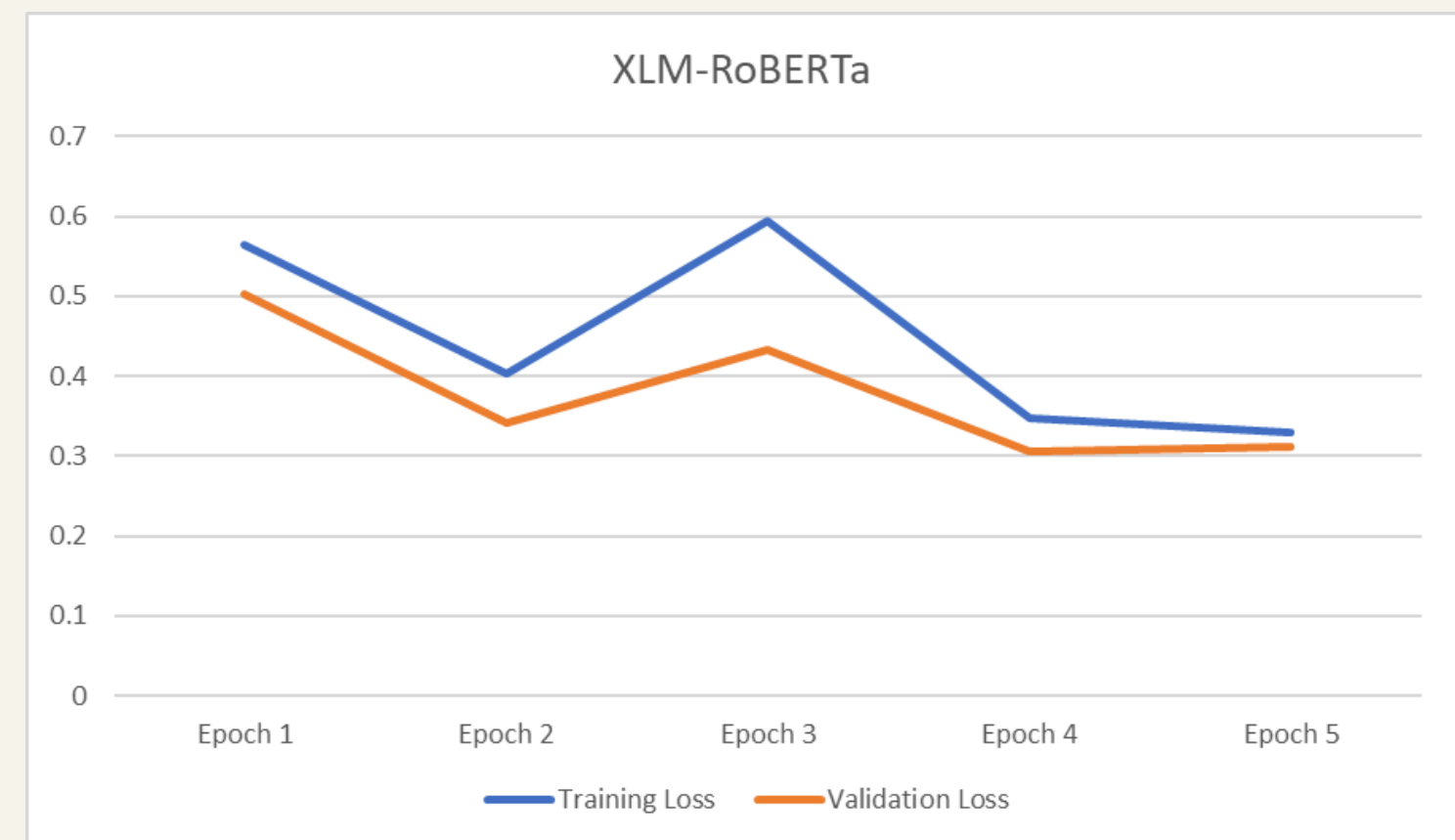
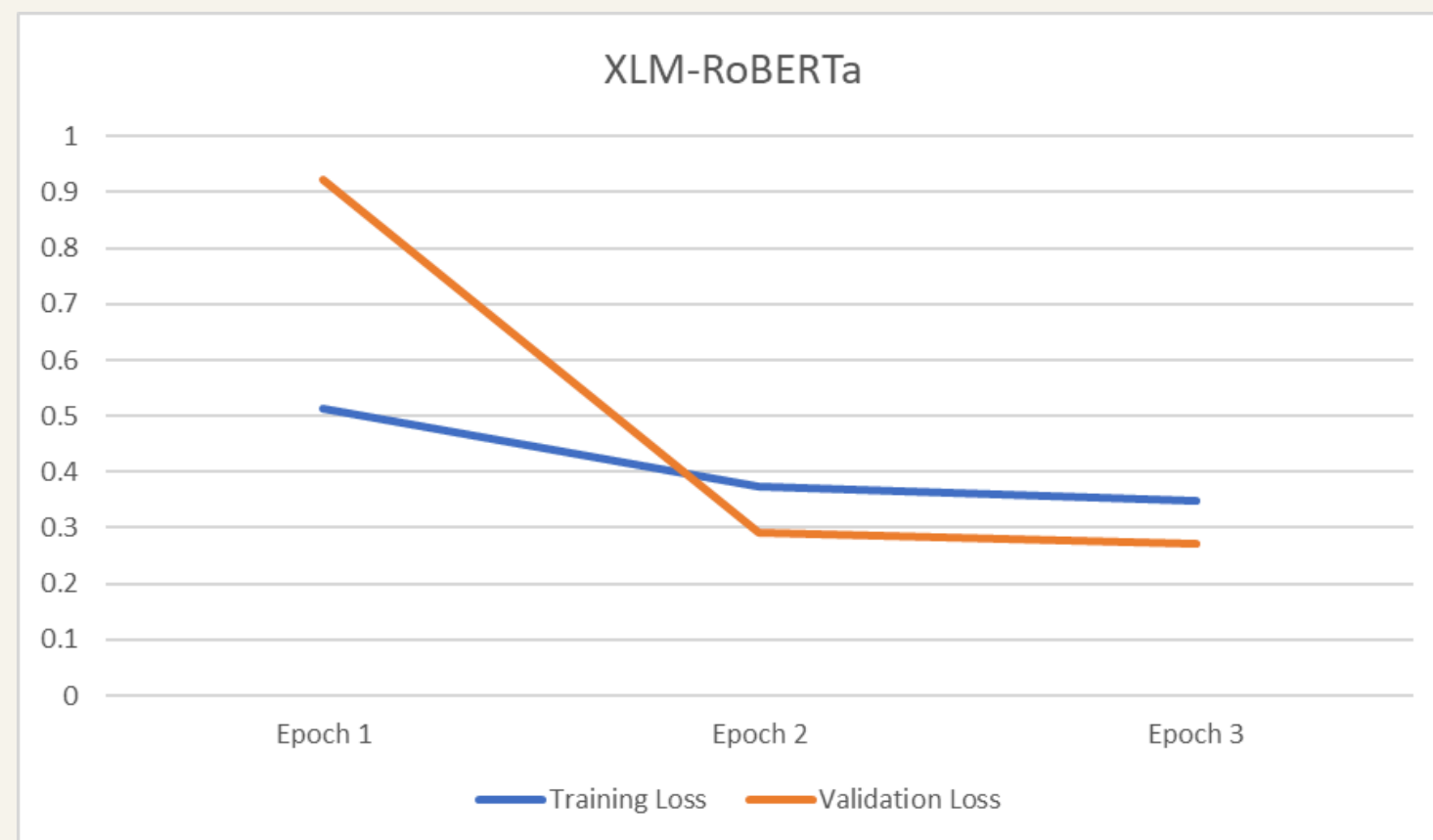
RESULT

Train & Validation Loss on mBERT



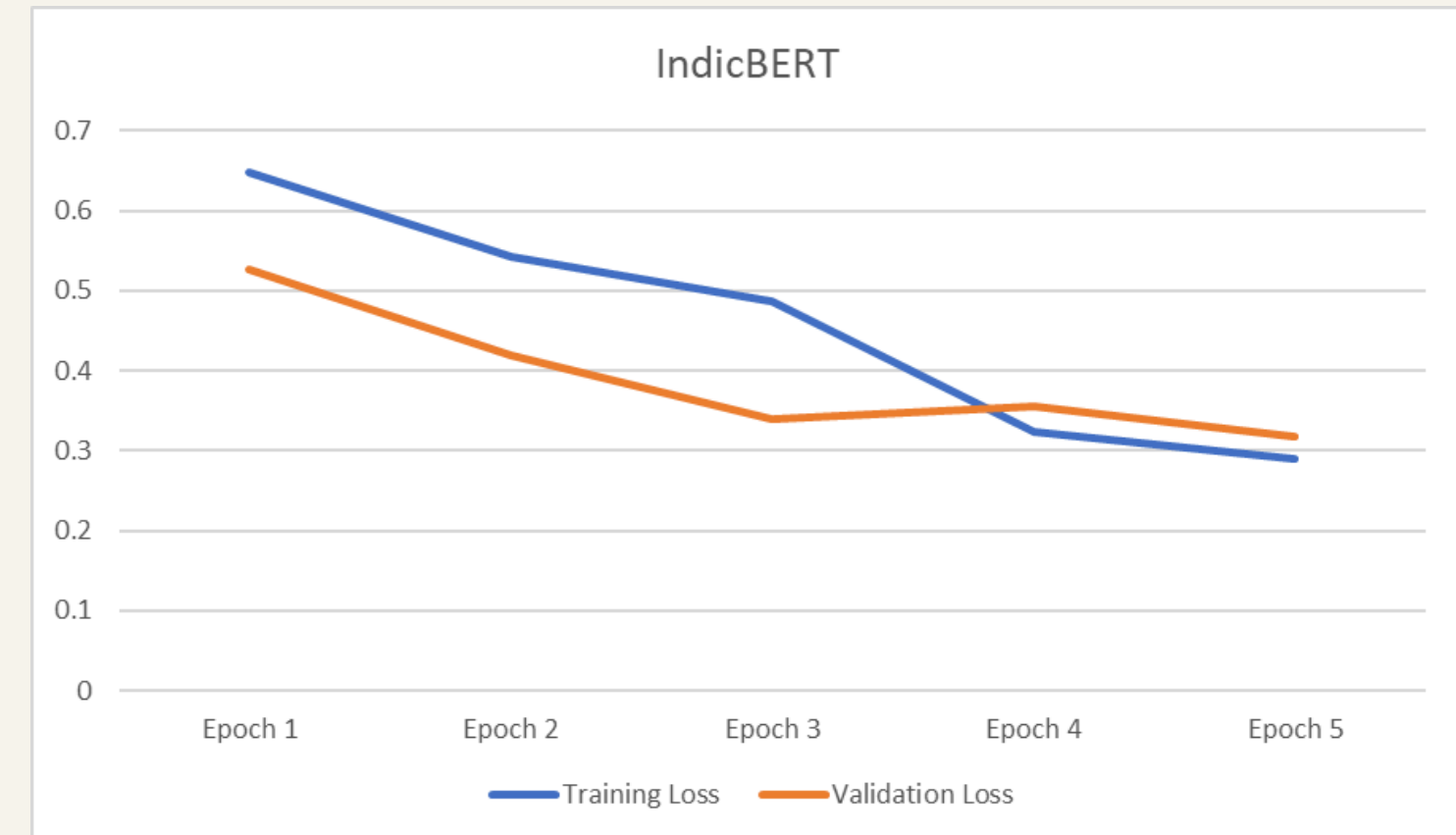
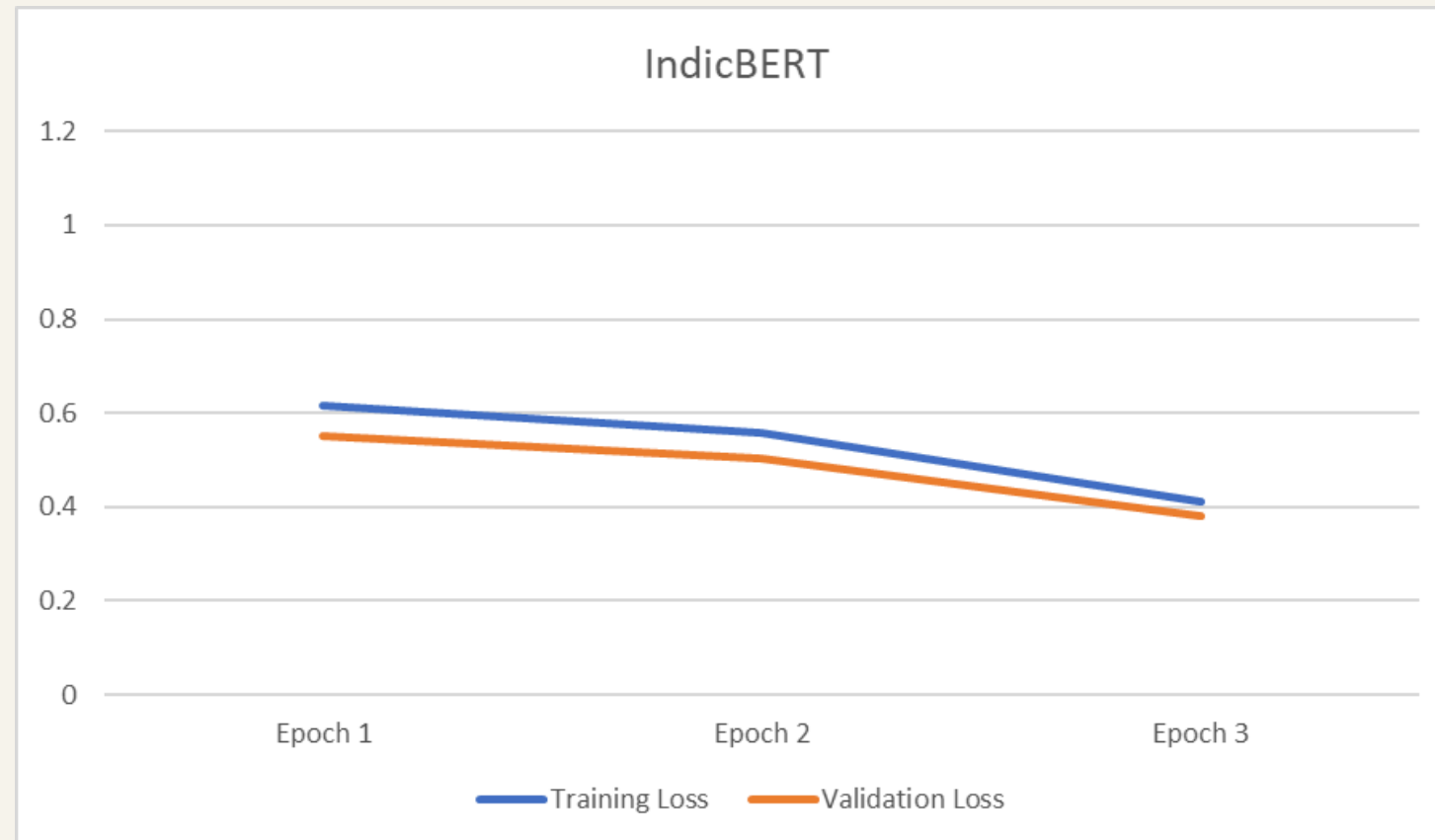
RESULT

Train & Validation Loss on XLM-RoBERTa



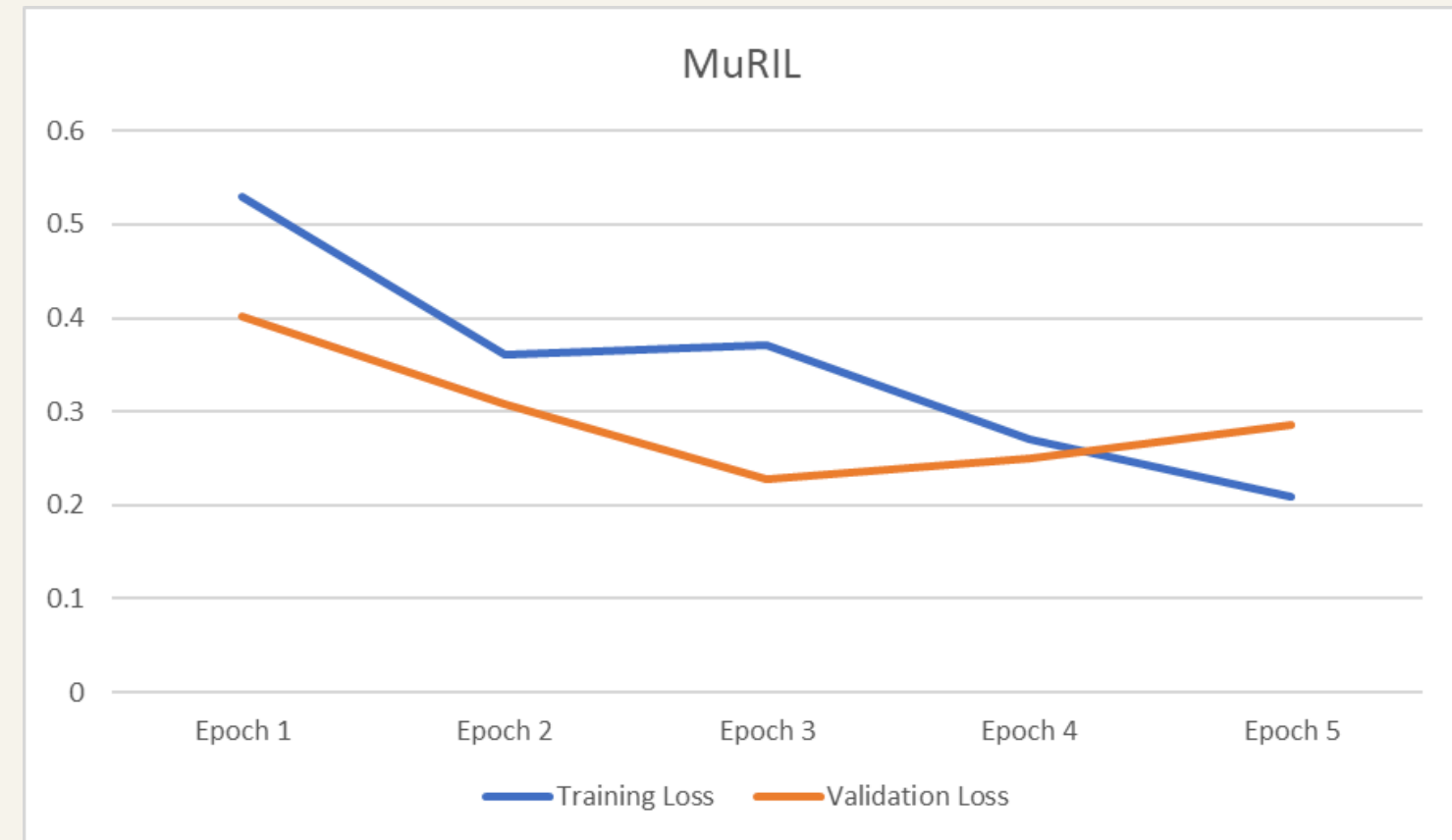
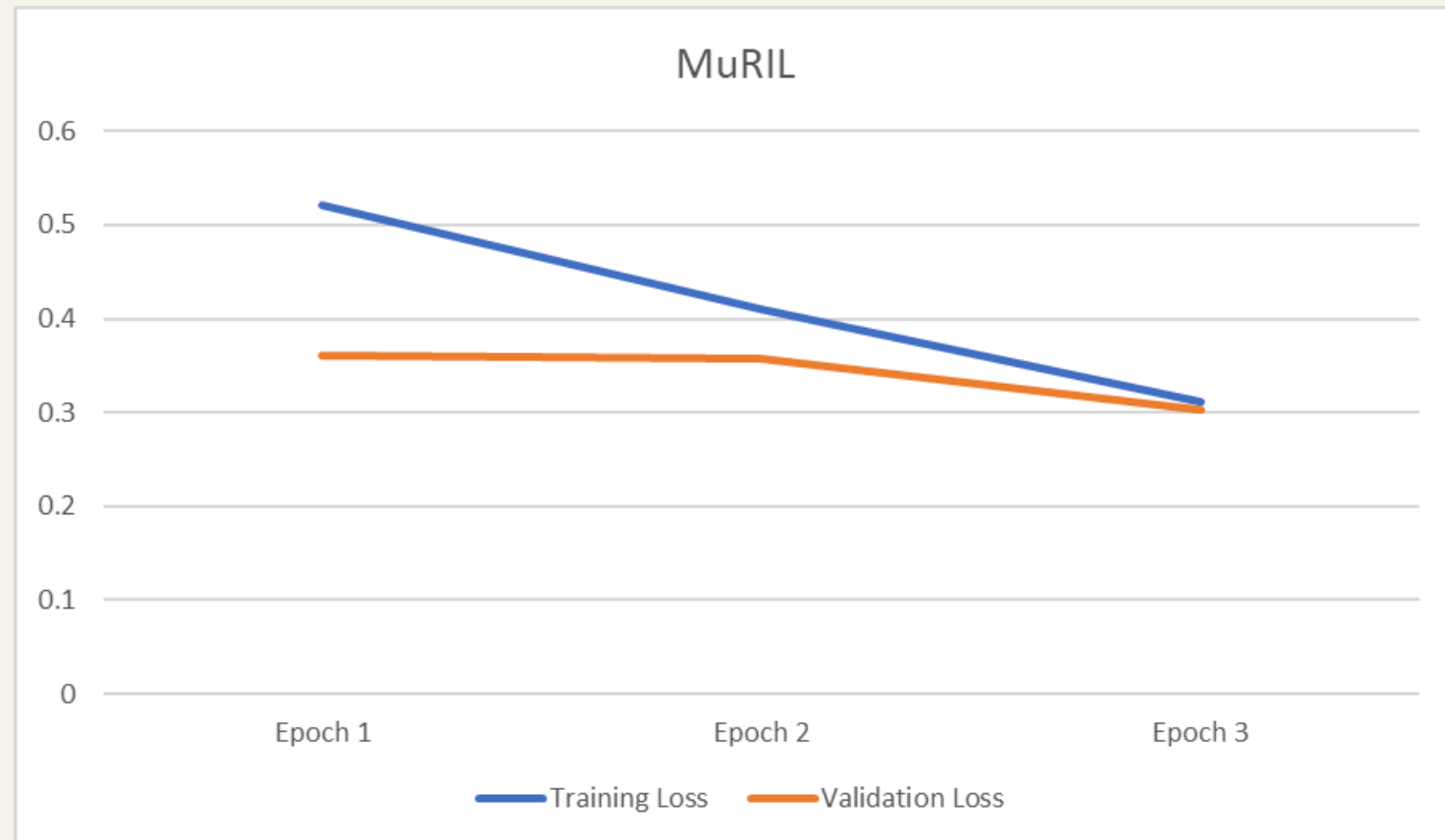
RESULT

Train & Validation Loss on IndicBERT



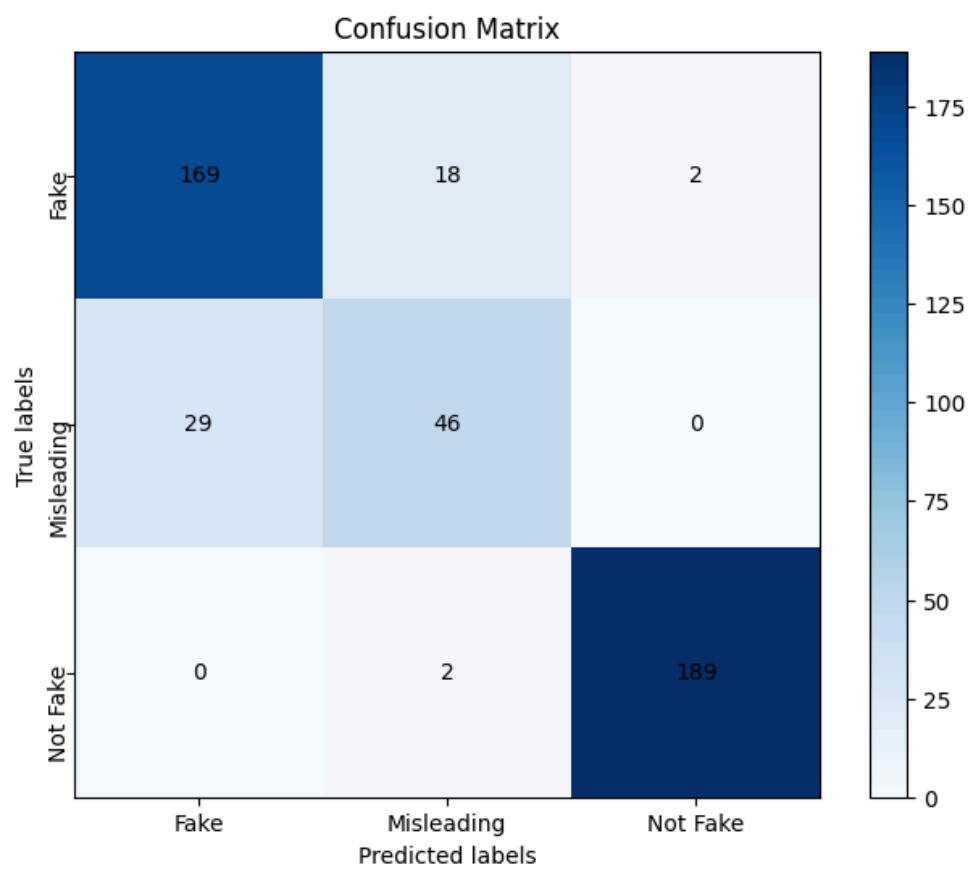
RESULT

Train & Validation Loss on MuRIL



RESULT

Confusion matrix of IndicBERT fine-tuned for 5 epoch

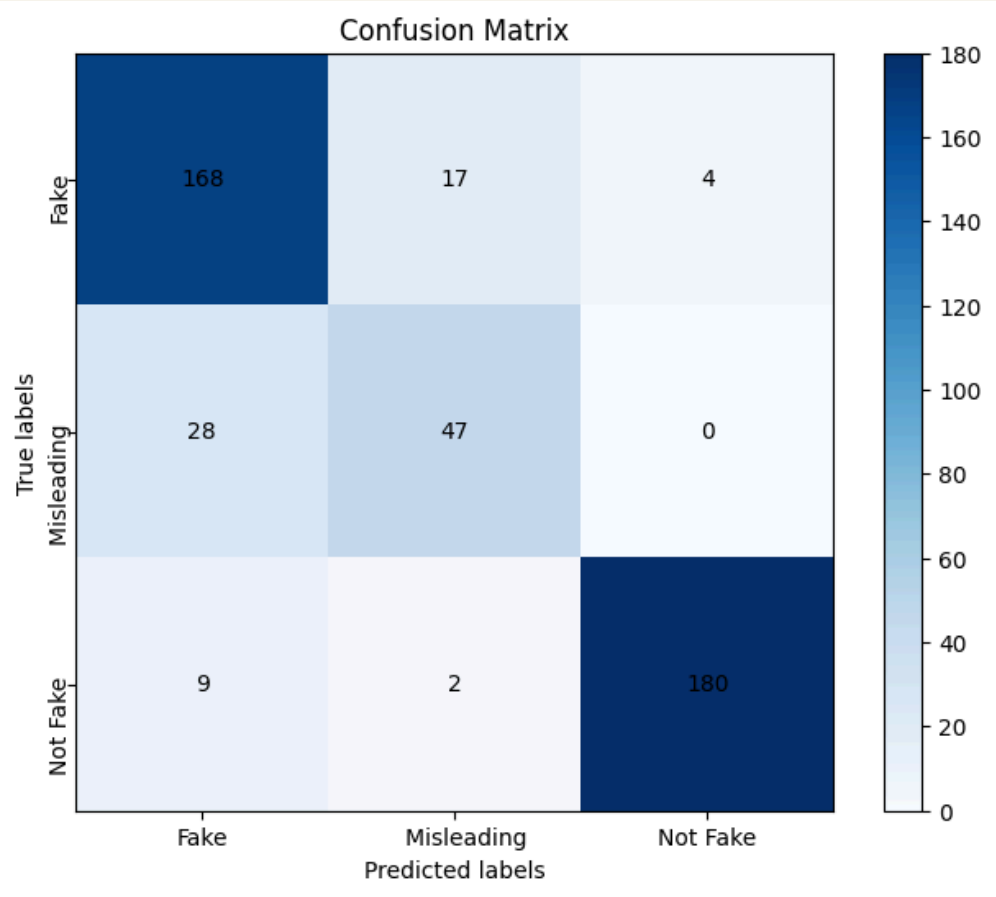


Metric	Fake	Misleading	Not Fake	Overall
Accuracy	-	-	-	0.868
Precision	0.82	0.71	0.98	0.868
Recall	0.89	0.63	0.94	0.868
F1-Score	0.85	0.67	0.96	0.867
Macro Avg	0.84	0.82	0.83	-
Weighted Avg	0.87	0.87	0.87	-

RESULT

Confusion matrix of MuRIL fine tuned for 3 epoch

Metric	Fake	Misleading	Not Fake	Overall
Accuracy	-	-	-	0.888
Precision	0.85	0.70	0.99	0.885
Recall	0.89	0.61	0.99	0.888
F1-Score	0.87	0.65	0.99	0.886
Macro Avg	0.85	0.83	0.84	-
Weighted Avg	0.88	0.89	0.89	-



REFERENCES

- Fake news detection in Dravidian languages using transfer learning with adaptive finetuning
- Fake News Detection in Dravidian Languages Using Transformer Models
- An adaptive cyclical learning rate based hybrid model for Dravidian fake news detection
- AbhiPaw@ DravidianLangTech: Fake News Detection in Dravidian Languages using Multilingual BERT

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THANK YOU