News Bias Detection For Malayalam News Articles

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under the supervision of

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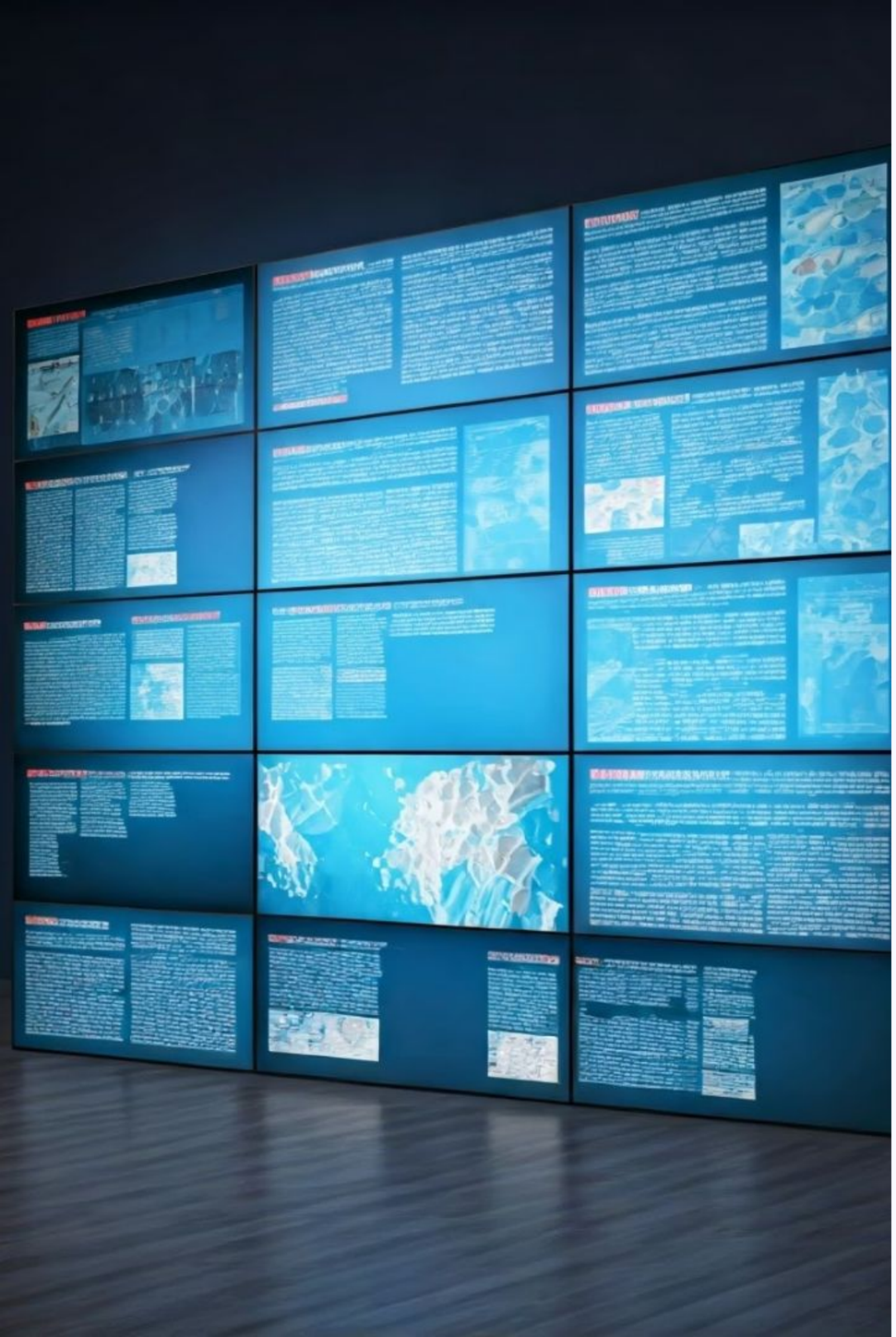
Problem Statement

Develop an automated system to classify the political leaning of Malayalam news articles as Left, Right, or Neutral using NLP techniques. Political bias in news can influence public opinion and democratic processes, making automated detection a crucial tool for promoting media literacy and transparency.



Introduction and Project Overview

Project Aim

Develop a system to automatically identify and analyse biases in news articles using NLP and machine learning.

Motivation

Malayalam news media shows diverse political leanings but lacks automated bias detection tools due to language-specific challenges.

Objectives

- Assemble and label Malayalam news dataset by political orientation
- Preprocess data for transformer models
- Fine-tune MURIL Base Uncased model
- Evaluate performance and analyse errors

Literature Review and Research Gaps

Background

Transformer models like BERT and MURIL have advanced NLP, enabling bias detection in English and Indian languages.

Research Gaps

Limited studies on Malayalam bias detection and lack of annotated datasets for regional language classification.

Significance

Addressing these gaps is crucial for accurate political bias detection in Malayalam news and enhancing media literacy.

Methodology: Data Collection and Preprocessing

Data Collection

- Scraped articles from multiple Malayalam news sources
- Collected 1,800 news articles

Preprocessing

- Tokenized using MURIL tokenizer
- Used Python 3.10, PyTorch, Transformers, and NLP libraries
- Deleted all English Words
- Cleaned data by removing HTML tags, duplicates, and non-Malayalam text

Methodology: Model Development

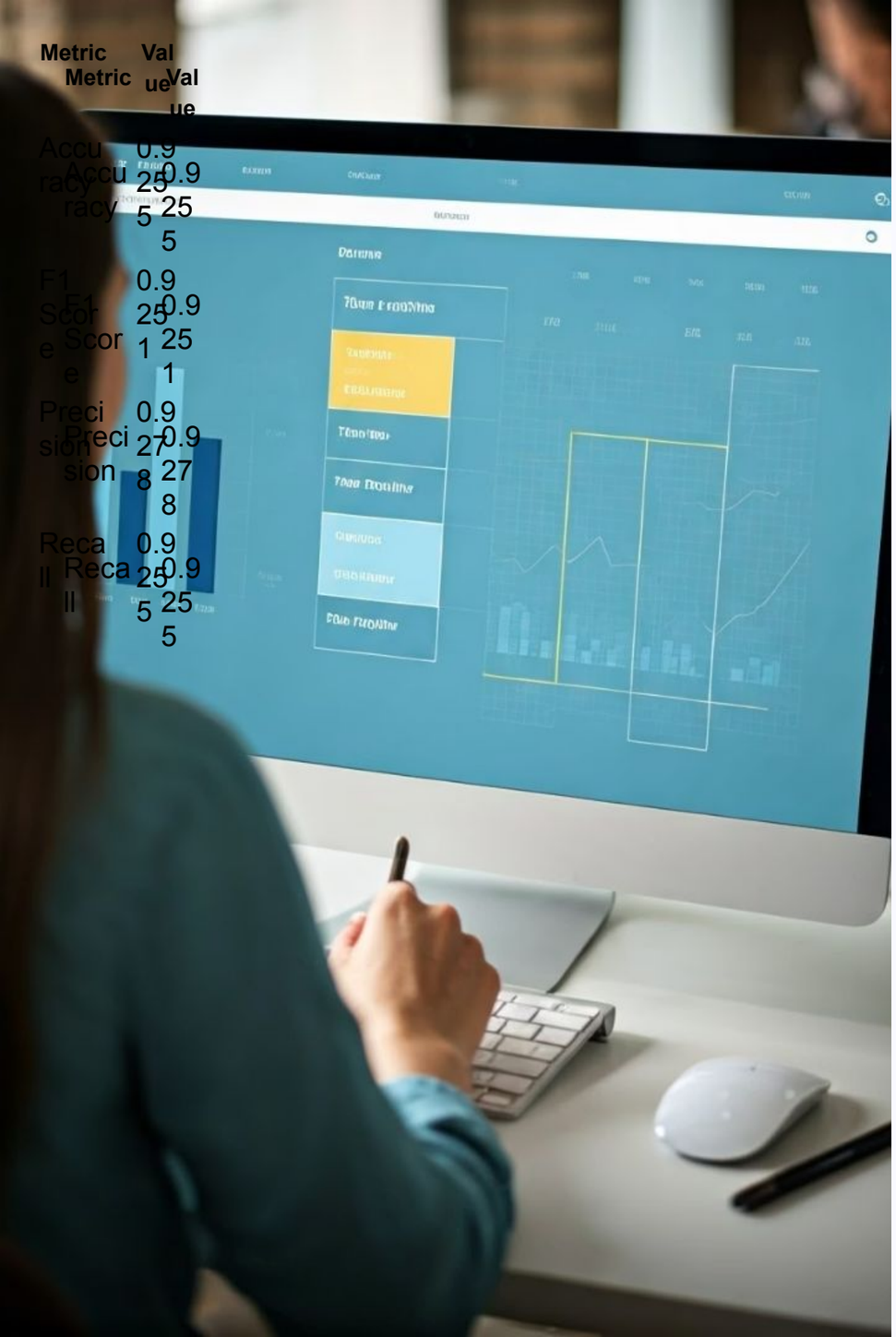
Model Fine-tuning & Tools

- Fine-tuned MURIL Base Uncased with dropout and classification head
- PyTorch, Transformers, and NLP libraries

- Training done on Google Colab with GPU support

Fine-tuning Parameters

- No. of Epochs -
- Learning rate -



Results and Analysis

Model Performance

Achieved an overall accuracy of 93%. Some accuracy drops occurred when names in articles were changed.

Metric	Value
Accuracy	0.9255
F1 Score	0.9251
Precision	0.9278
Recall	0.9255

Conclusion and Future Directions

Summary of Findings

Successfully fine-tuned MURIL model for Malayalam political bias classification with 0.93 accuracy, exceeding the 0.90 target.

Future Work

Expand dataset sources and timeframes, perform hyperparameter tuning, and implement model explainability techniques.

Project Impact

Demonstrates feasibility of transformer models for regional language bias detection, promoting media literacy and research.

Bibliography

1. Devlin, J., Chang, M.-W., Lee, K., and Toutanova, K. (2019). BERT: Pre-training of Deep Bidirectional Transformers.
2. Khanuja, H., et al. (2021). MURIL: Multilingual Representations for Indian Languages. arXiv preprint.
3. Das, A., et al. (2020). Political Bias Detection in News Articles using NLP. International Conference on NLP.
4. Subramanian, R., et al. (2022). Malayalam BERT: A Monolingual Language Model for Malayalam. ACL Workshop.