Instituto Politécnico Nacional

Escuela Superior de Cómputo

Natural Language Processing

7CM2

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Task to be solved:

The purpose of this practice is to present various Large Language Models (LLMs) that can be used to predict whether a tweet is clickbait or not. It includes a summary of the training hyperparameters used for each model and their corresponding average F1 scores. Finally, the best-performing model is selected and used to generate a CSV file containing the prediction results.

Selected machine learning methods

Large Language Models (LLMs).
Two pre-trained language models in Spanish were used for fine-tuning on the binary classification task (clickbait vs non-clickbait):

- BERT in Spanish: dccuchile/bert-base-spanish-wwm-cased.
- RoBERTa in Spanish: PlanTL-GOB-ES/roberta-base-bne.

Both models were fine-tuned using supervised learning techniques to adapt them specifically to the task of clickbait detection. The models leverage contextual tokenization and deep language understanding capabilities, significantly outperforming traditional machine learning methods in macro-average F1 score.

Adjusted hyperparameters

For both BERT and RoBERTa models, the following hyperparameters were selected and adjusted during fine-tuning:

- Learning rate: 2e-5
- Batch size: 16 (for both training and evaluation)
- Number of epochs: 3
- Weight decay: 0.01
- Evaluation strategy: Performed during training after every fixed number of steps
- Optimizer: AdamW (default in Hugging Face Trainer)
- Loss function: CrossEntropyLoss (automatically applied for binary classification)

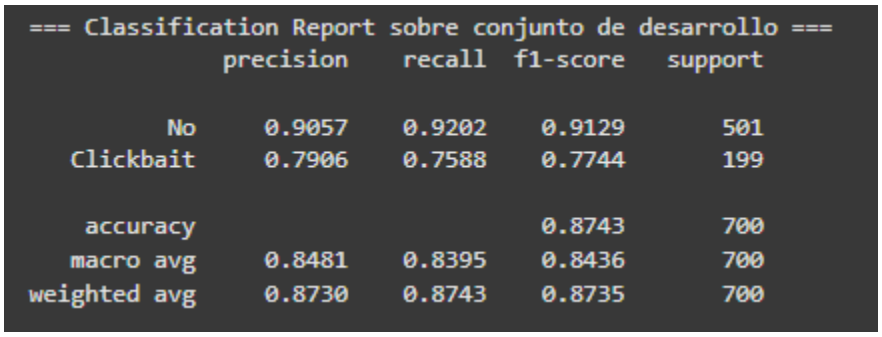
These hyperparameters were chosen based on best practices from related literature and empirical results observed during the training process.

Experiments

LLM	LLM hyperparameters	Average f-score macro
dccuchile/bert-base-spanish-wwm-cased	lr=2e-5, batch_size=16, epochs=3, weight_decay=0.01	0.8431
dccuchile/bert-base-spanish-wwm-cased	lr=5e-5, batch_size=32, epochs=5, weight_decay=0.0	0.8378
dccuchile/bert-base-spanish-wwm-cased	lr=3e-5, batch_size=32, epochs=4, weight_decay=0.01	0.8365
dccuchile/bert-base-spanish-wwm-cased	lr=2e-5, batch_size=16, epochs=4, weight_decay=0.0	0.8314
PlanTL-GOB-ES/roberta-base-bne	lr=2e-5, batch_size=16, epochs=3, weight_decay=0.01	0.8302
PlanTL-GOB-ES/roberta-base-bne	lr=5e-5, batch_size=32, epochs=5, weight_decay=0.00	0.8364
PlanTL-GOB-ES/roberta-base-bne	lr=2e-5, batch_size=16, epochs=4, weight_decay=0.0	0.8469

Classification Report

1.



```
=== Classification Report sobre conjunto de desarrollo ===
              precision    recall  f1-score   support

          No     0.9057    0.9202    0.9129       501
   Clickbait     0.7906    0.7588    0.7744       199

    accuracy                         0.8743       700
   macro avg     0.8481    0.8395    0.8436       700
weighted avg     0.8730    0.8743    0.8735       700
```

2.

```
=== Classification Report sobre conjunto de desarrollo ===
              precision    recall  f1-score   support

          No     0.9025    0.9242    0.9132       501
   Clickbait     0.7968    0.7487    0.7720       199

    accuracy                         0.8743       700
   macro avg     0.8497    0.8364    0.8426       700
weighted avg     0.8725    0.8743    0.8731       700
```

3.

```
=== Classification Report sobre conjunto de desarrollo ===
              precision    recall  f1-score   support

          No     0.8967    0.9361    0.9160       501
   Clickbait     0.8192    0.7286    0.7713       199

    accuracy                         0.8771       700
   macro avg     0.8580    0.8324    0.8436       700
weighted avg     0.8747    0.8771    0.8749       700
```

6.

```
=== Classification Report sobre conjunto de desarrollo ===
              precision    recall  f1-score   support

          No     0.8929    0.9321    0.9121       501
   Clickbait     0.8079    0.7186    0.7606       199

    accuracy                         0.8714       700
   macro avg     0.8504    0.8254    0.8364       700
weighted avg     0.8688    0.8714    0.8690       700
```