Anchor-Slave Contrastive Fine-Tuning Framework

English Text

"Polarized sentence..."

African Language Text

(Amharic/Hausa/Swahili)

(English - Static)

Task-Optimized
e.g., LaBSE, DeBERTa

🔒 Frozen Weights

(African Lang - Trainable)

Smaller/Distilled
e.g., DistilBERT, DeBERTa-small

⚡ Fine-tuning Active

z^A (Static)

English Embedding

z^S (Aligned)

African Lang Embedding

Contrastive Loss

$\text{CosSim}(z^S, z^A) / \tau$

InfoNCE Alignment

Classification Loss

L_{CE}

Key Objectives:

• Align embeddings across languages

• Maintain task performance

• Enable non-matching architectures

• Computational efficiency

Total Loss

$(1-\lambda)L_{CE} + \lambda L_{Align}$