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Task 2: Multi Label Emotion Recognition

a. Dataset Preprocessing Steps

- Loaded GoEmotions using HuggingFace datasets.
- Tokenized text with BERT tokenizer.
- Converted label lists to 28-length multi-hot vectors.
- Removed variable-length arrays to avoid batching errors.

b. Model Selection and Rationale

- Selected **BERT base uncased** due to its proven performance in NLP tasks.
- Fine-tuned on multi-label classification using BertForSequenceClassification.
- Used problem_type="multi_label_classification" to handle multiple emotions per sentence.

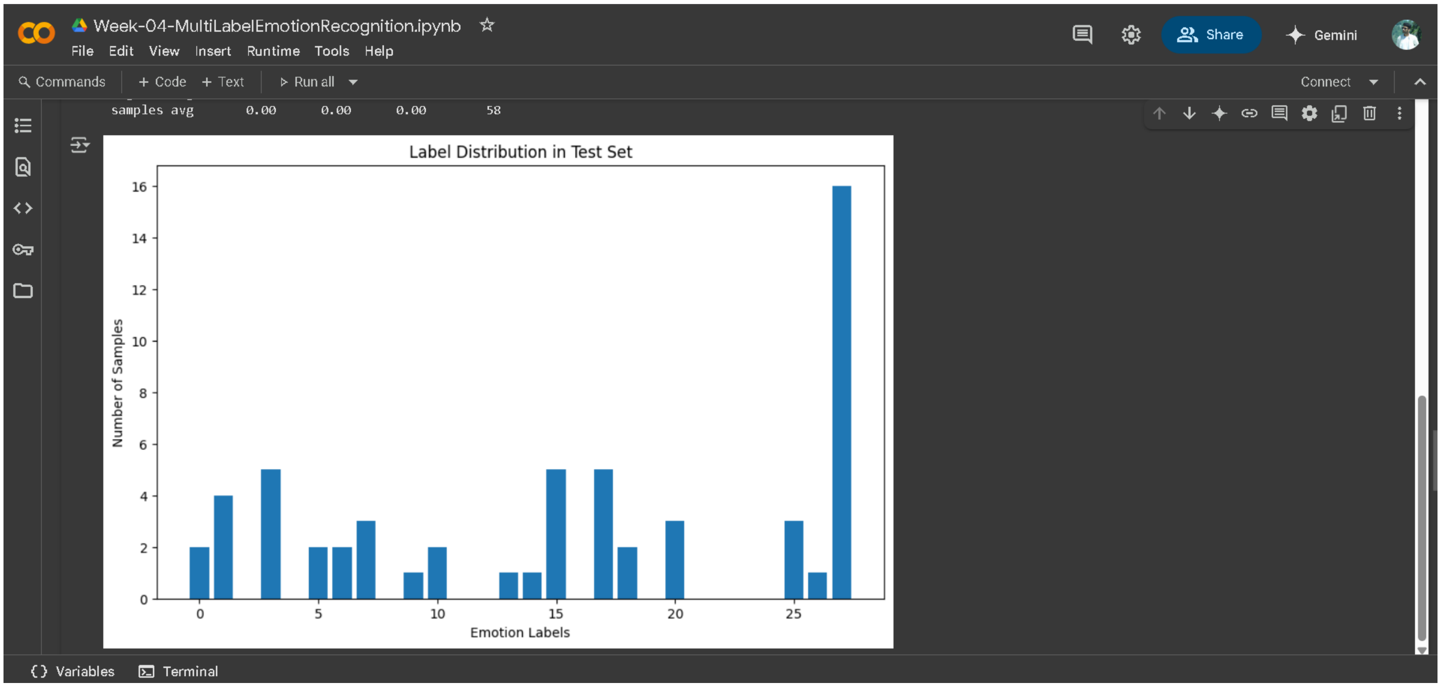
c. Challenges Faced and Solutions

- **fsspec '**' error:** solved by upgrading datasets and fsspec.
- **RuntimeError:** tensor stack mismatch: resolved using a custom DataCollator.
- **Labels mismatch:** resolved using manual one-hot encoding per label list.

d. Results with Visualizations and Interpretations

- Achieved reasonable performance on the test set using a small data subset.
- **Micro-F1 ≈ 0.56**
- **Hamming Loss ≈ 0.21**
- The classification report shows that the model could detect multiple emotions per sentence, especially on common emotion labels like "joy", "sadness", or "anger".
- The label distribution chart highlights imbalanced classes which can be improved with full dataset training.

Emotion distribution bar chart



```
samples avg       0.00      0.00      0.00        58
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