Classification Loss: Cross-Entropy

Measuring dissimilarity between predicted and true distributions

📊 Core Concept

Measures the difference between predicted probability distribution and actual labels, outputting probability distribution through Softmax activation

✓ Encourages high confidence for correct classes

✓ Larger penalty for confident wrong predictions

≡ Equivalent to maximizing log-likelihood of correct class

1 Binary Cross-Entropy

Used for binary classification problems

2 Classes (0 or 1)

2 Categorical Cross-Entropy

Used for multi-class classification problems

N Classes (Multi-class)

📝 Calculation Examples

Binary Cross-Entropy Examples

Categorical Cross-Entropy Examples

Loss = -[y·log(p) + (1-y)·log(1-p)]	Loss = -Σ y·log(p) (only correct class)
True=1, Pred=0.95 **Loss = 0.051**	True=[0,1,0], Pred=[0.1,0.8,0.1] **Loss = 0.223**
True=1, Pred=0.70 **Loss = 0.357**	True=[1,0,0], Pred=[0.7,0.2,0.1] **Loss = 0.357**
True=0, Pred=0.10 **Loss = 0.105**	True=[0,0,1], Pred=[0.2,0.2,0.6] **Loss = 0.511**
True=1, Pred=0.50 **Loss = 0.693**	True=[0,1,0], Pred=[0.4,0.4,0.2] **Loss = 0.916**
True=1, Pred=0.20 **Loss = 1.609**	True=[1,0,0], Pred=[0.2,0.5,0.3] **Loss = 1.609**