Focal Loss: Addressing Class Imbalance

Focusing on Hard Examples

🎯 Target Problem

Designed to solve severe class imbalance problems
Aligns learning with business metrics or task requirements

Focal Loss Formula

$$FL = -\alpha(1-p)^{\gamma} \log(p)$$

Working Mechanism

- ↓ Down-weights loss for well-classified examples
- ↑ Focuses learning on hard, misclassified examples
- ✓ Greatly improves minority class performance

Key Parameters

γ Focusing Parameter

Controls down-weighting rate
Reduces contribution of well-classified examples

Typical value: γ = 2

α Balancing Parameter

Addresses class imbalance problem
Adjusts per-class weights

Addresses class imbalance

💡 Main Applications

- Object Detection (e.g., RetinaNet)

- Imbalanced Classification Tasks