Case Study: Mobile Diagnostics

Case Study: Mobile Skin Cancer Diagnosis App

Implementing a real-time mobile diagnostic system through deep learning model compression

Problem Definition

🎯 **Goal:** Classify benign/malignant from skin lesion images

📱 **Platform:** iOS/Android mobile app

⚡ **Requirements:** Results within 3 seconds, offline operation

Compression Approach

Step 1: Base Model

ResNet-50 (98MB, FP32)

Accuracy: 94.5%

Inference: 2.5s

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Step 2: Knowledge Distillation

MobileNetV3 Student

Size: 24MB

Accuracy: 93.2%

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Step 3: INT8 Quantization

Size: 6MB (75% reduction)

Accuracy: 92.8%

Inference: 0.8s

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Final: TFLite Optimization

Final Size: 5.2MB

Accuracy: 92.5%

Inference: 0.6s ✅

Final Results

94.7%	76%	-2.0%
Size Reduction	Speed Improvement	Accuracy Change