Model Architecture

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BASE MODEL: EfficientNet-B0
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EfficientNet-B0 is a convolutional neural network that achieves
state-of-the-art accuracy with fewer parameters.

Pre-trained on: ImageNet (1000 classes)
Total Parameters: ~5.3 million
Input Size: 224 x 224 x 3

TRANSFER LEARNING APPROACH:
1. Load pre-trained EfficientNet-B0
2. Freeze backbone layers
3. Replace classifier head
4. Train in 2 phases

CUSTOM CLASSIFIER HEAD:
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nn.Sequential(
    nn.Dropout(0.25),
    nn.Linear(1280, 512),
    nn.ReLU(),
    nn.BatchNorm1d(512),
    nn.Dropout(0.15),
    nn.Linear(512, 181)  # 181 food categories
)

TRAINING PHASES:
Phase 1 (Warmup): 3 epochs
- Only classifier layers trainable
- Higher learning rate (0.003)

Phase 2 (Fine-tuning): 22 epochs
- Last 3 blocks unfrozen
- Cosine annealing learning rate
- 3,905,489 trainable parameters
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Data Augmentation

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DATA AUGMENTATION PIPELINE:
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Training Transforms:
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Food Recipe Generator - Model Architecture

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1. Resize(256)
2. RandomResizedCrop(224, scale=(0.8, 1.0))
3. RandomHorizontalFlip(p=0.5)
4. RandomRotation(15 degrees)
5. ColorJitter(brightness=0.2, contrast=0.2,
               saturation=0.2, hue=0.1)
6. ToTensor()
7. Normalize(mean=[0.485, 0.456, 0.406],
             std=[0.229, 0.224, 0.225])

Validation Transforms:
1. Resize(256)
2. CenterCrop(224)
3. ToTensor()
4. Normalize(same as training)

PURPOSE:
- Prevent overfitting
- Improve generalization
- Make model robust to variations
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