

Model Development Phase Template

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Project Title	GreenClassify: A Vegetable Classifier

Initial Model Training Code, Model Validation and Evaluation Report

Initial Model Training Code

```
# Load pre-trained MobileNetV2
base_model = MobileNetV2(weights='imagenet', include_top=False, input_shape=(224, 224, 3))
base_model.trainable = False

# Add custom layers
x = base_model.output
x = GlobalAveragePooling2D()(x)
x = Dense(128, activation='relu')(x)
predictions = Dense(15, activation='softmax')(x) # 15 vegetable classes
model = Model(inputs=base_model.input, outputs=predictions)

# Compile model
model.compile(optimizer=Adam(learning_rate=0.001),
              loss='categorical_crossentropy',
              metrics=['accuracy'])

# Train model
history = model.fit(train_data, validation_data=val_data, epochs=10)

# Save model
model.save('vegetable_classifier_model.h5')
```

Model Validation and Evaluation Report

Model	Summary	Training and Validation Performance Metrics
Model 1 (MobileNetV2 + Custom Layers)	Layer Summary: <ul style="list-style-type: none"> • MobileNetV2 base model • GlobalAveragePooling2D • Dense(100, relu) • BatchNormalization • Dropout(0.5) • Dense(3, softmax) Total Parameters: 2,311,305 Trainable Parameters: 2,304,505 Non-trainable Parameters: 5,500	Training Accuracy: 87.71% Validation Accuracy: 89.24% Training converged well with slight overfitting mitigated by dropout and batch normalization.