SimCLR-Based Potato Disease Classification Model

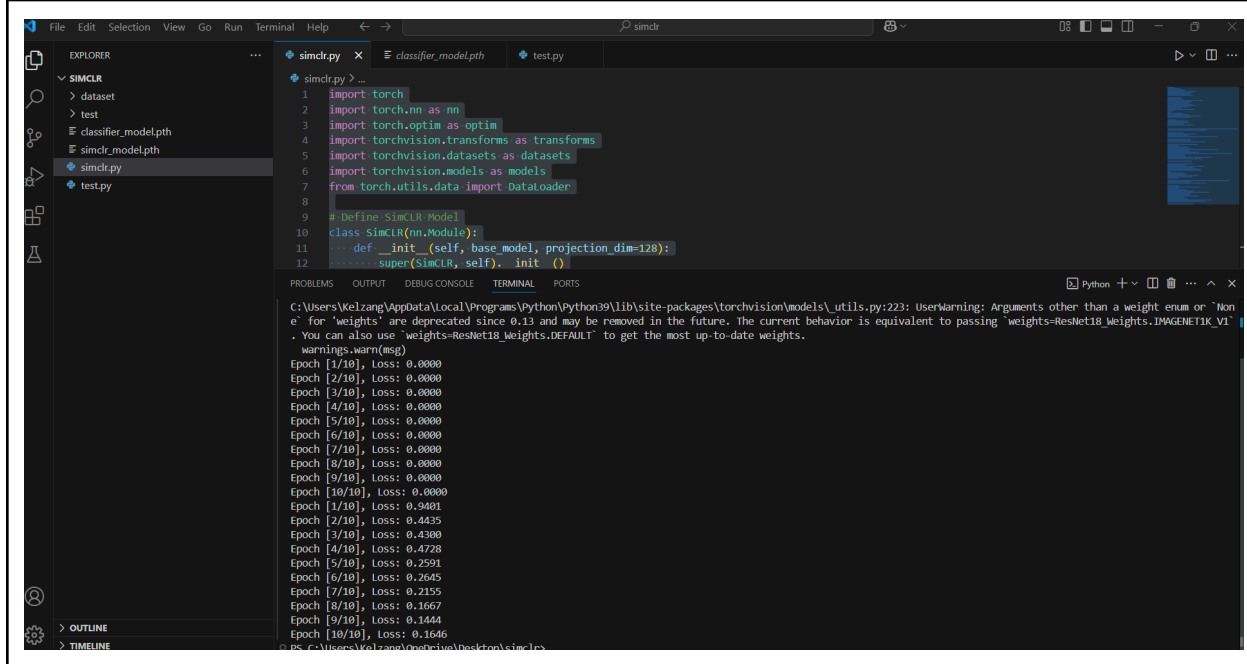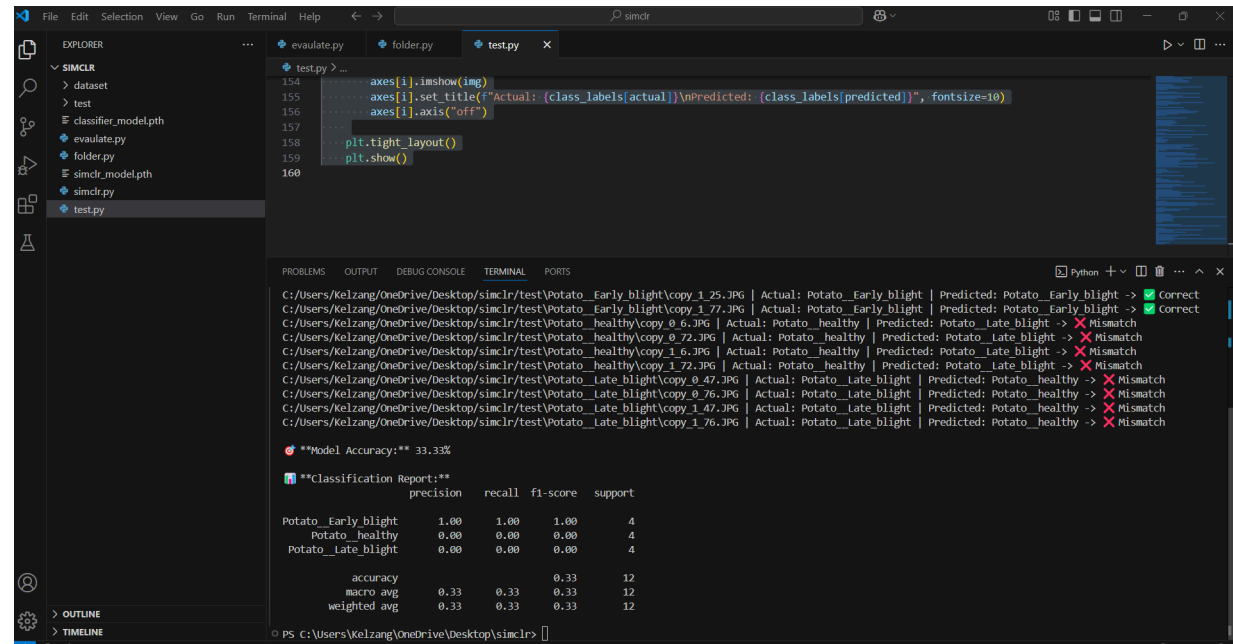| |
|---|
| Load and transform potato disease images using PyTorch's `ImageFolder`. |
| Train a ResNet18-based SimCLR model for contrastive feature learning. |
| Use the trained SimCLR encoder to extract meaningful features. |
| Train a classifier using extracted features to categorize images into three classes. |
| Save trained models for later use in inference and deployment. |

Training the model

Testing and performance of the model


```
154         axes[i].imshow(img)
155         axes[i].set_title(f"Actual: {class_labels[actual]}\nPredicted: {class_labels[predicted]}", fontsize=10)
156         axes[i].axis("off")
157     
158     plt.tight_layout()
159     plt.show()
160
```

```
C:/Users/Kelzang/OneDrive/Desktop/simclr/test\Potato__Early_blight\copy_1_25.JPG | Actual: Potato__Early_blight | Predicted: Potato__Early_blight -> ✅ Correct
C:/Users/Kelzang/OneDrive/Desktop/simclr/test\Potato__Early_blight\copy_1_77.JPG | Actual: Potato__Early_blight | Predicted: Potato__Early_blight -> ✅ Correct
C:/Users/Kelzang/OneDrive/Desktop/simclr/test\Potato__healthy\copy_0_6.JPG | Actual: Potato__healthy | Predicted: Potato__Late_blight -> ❌ Mismatch
C:/Users/Kelzang/OneDrive/Desktop/simclr/test\Potato__healthy\copy_0_72.JPG | Actual: Potato__healthy | Predicted: Potato__Late_blight -> ❌ Mismatch
C:/Users/Kelzang/OneDrive/Desktop/simclr/test\Potato__healthy\copy_1_6.JPG | Actual: Potato__healthy | Predicted: Potato__Late_blight -> ❌ Mismatch
C:/Users/Kelzang/OneDrive/Desktop/simclr/test\Potato__healthy\copy_1_72.JPG | Actual: Potato__healthy | Predicted: Potato__Late_blight -> ❌ Mismatch
C:/Users/Kelzang/OneDrive/Desktop/simclr/test\Potato__Late_blight\copy_0_47.JPG | Actual: Potato__Late_blight | Predicted: Potato__healthy -> ❌ Mismatch
C:/Users/Kelzang/OneDrive/Desktop/simclr/test\Potato__Late_blight\copy_0_76.JPG | Actual: Potato__Late_blight | Predicted: Potato__healthy -> ❌ Mismatch
C:/Users/Kelzang/OneDrive/Desktop/simclr/test\Potato__Late_blight\copy_1_47.JPG | Actual: Potato__Late_blight | Predicted: Potato__healthy -> ❌ Mismatch
C:/Users/Kelzang/OneDrive/Desktop/simclr/test\Potato__Late_blight\copy_1_76.JPG | Actual: Potato__Late_blight | Predicted: Potato__healthy -> ❌ Mismatch

🎯 **Model Accuracy:** 33.33%

📊 **Classification Report:**
                      precision    recall  f1-score   support

Potato__Early_blight       1.00      1.00      1.00         4
     Potato__healthy       0.00      0.00      0.00         4
  Potato__Late_blight      0.00      0.00      0.00         4

            accuracy                           0.33        12
           macro avg       0.33      0.33      0.33        12
        weighted avg       0.33      0.33      0.33        12

PS C:\Users\Kelzang\OneDrive\Desktop\simclr>
```
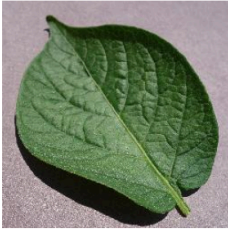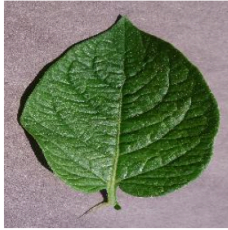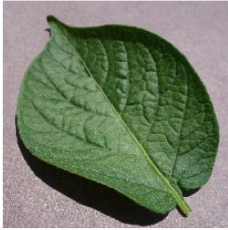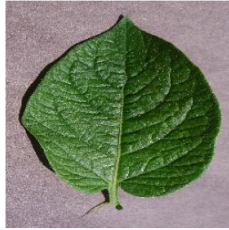

Actual: Potato__healthy
Predicted: Potato__Late_blight

Actual: Potato__healthy
Predicted: Potato__Late_blight

Actual: Potato__healthy
Predicted: Potato__Late_blight

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Predicted: Potato__Late_blight

Actual: Potato__Late_blight
Predicted: Potato__healthy