Confusion Matrix

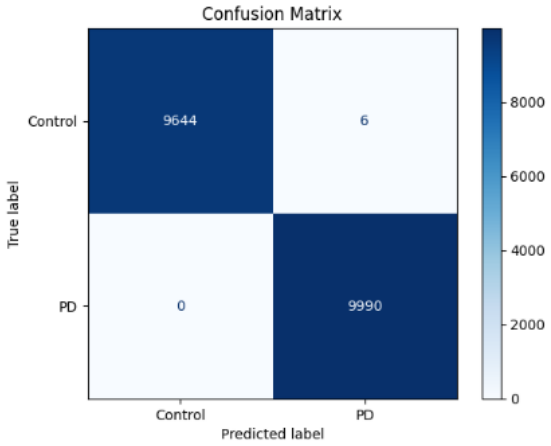

Figure 1(a) ALEXNET

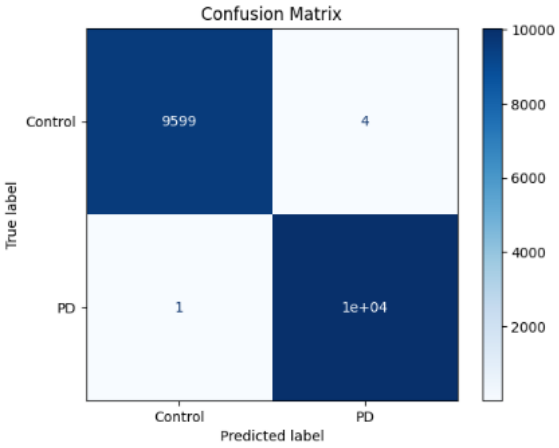

Figure 1(b) VGG16

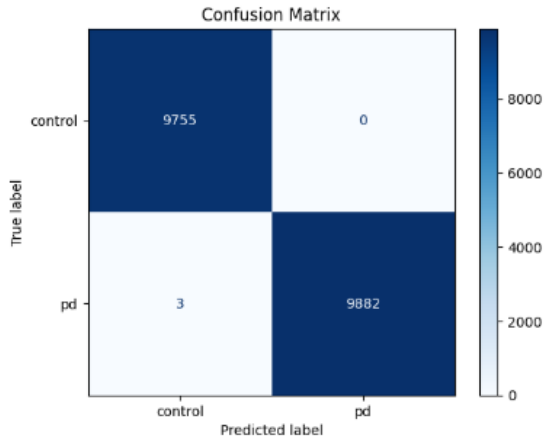

Figure 1(c) RESNET

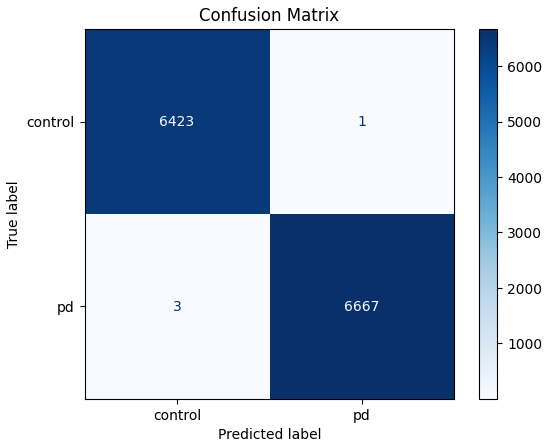

Figure 1(d) Custom CNN

Figure 1. Confusion matrices for Parkinson's Disease (PD) classification using different CNN architectures. (a) AlexNet (cross-validation), (b) VGG16 (cross-validation), (c) ResNet (cross-validation), and (d) the proposed custom CNN (train-test 80%-20% split). All models achieve near-perfect classification, with misclassifications limited to fewer than five samples across tens of thousands of trials. Custom CNN achieve a perfectly balanced separation of control and PD cases, indicating superior generalization compared to standard pre-trained architectures.

Training Validation Loss Curve

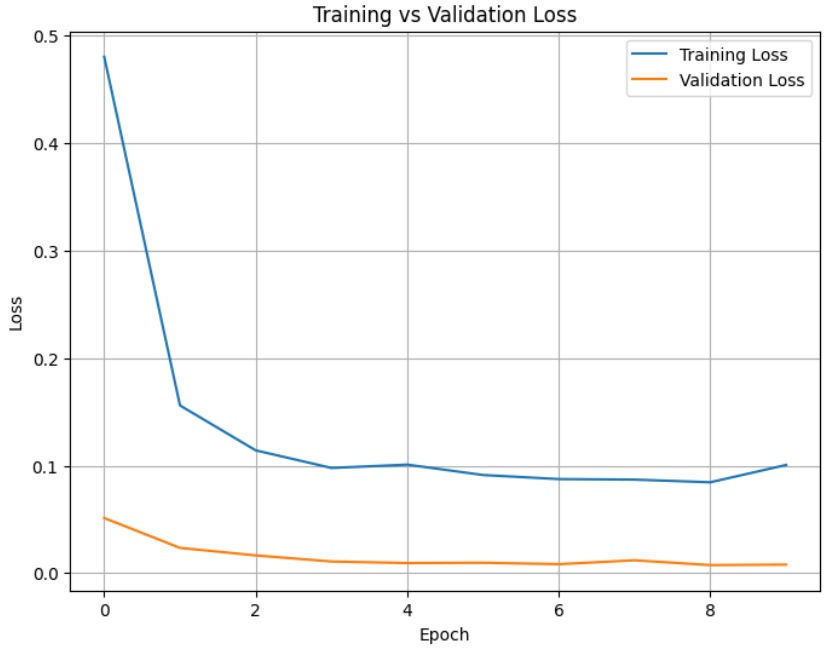

Figure 2. Training and validation loss curves for the proposed CNN model. The training loss decreases sharply within the first few epochs before stabilizing, while the validation loss remains consistently low and converges near zero. The absence of divergence between the two curves indicates that the model achieves strong generalization without overfitting.