Bi-GRU with Grey Wolf Optimizer - Project Results

Tuned Model Parameters (After GWO Optimization):

GRU Units: 115

Dropout Rate: 0.471952571119288

Training Log:

Epoch 1/10 - accuracy: 0.5793 - loss: 1.1882 - val_accuracy: 1.0000 - val_loss: 0.0514

Epoch 2/10 - accuracy: 0.9934 - loss: 0.0899 - val_accuracy: 1.0000 - val_loss: 0.0199

Epoch 3/10 - accuracy: 0.9990 - loss: 0.0443 - val_accuracy: 1.0000 - val_loss: 0.0119

Epoch 4/10 - accuracy: 1.0000 - loss: 0.0326 - val_accuracy: 1.0000 - val_loss: 0.0089

Epoch 5/10 - accuracy: 0.9954 - loss: 0.0262 - val_accuracy: 1.0000 - val_loss: 0.0057

Epoch 6/10 - accuracy: 0.9981 - loss: 0.0181 - val_accuracy: 1.0000 - val_loss: 0.0041

Epoch 7/10 - accuracy: 1.0000 - loss: 0.0150 - val_accuracy: 1.0000 - val_loss: 0.0029

Epoch 8/10 - accuracy: 1.0000 - loss: 0.0100 - val_accuracy: 1.0000 - val_loss: 0.0021

Epoch 9/10 - accuracy: 1.0000 - loss: 0.0081 - val_accuracy: 1.0000 - val_loss: 0.0017

Epoch 10/10 - accuracy: 1.0000 - loss: 0.0062 - val_accuracy: 1.0000 - val_loss: 0.0013

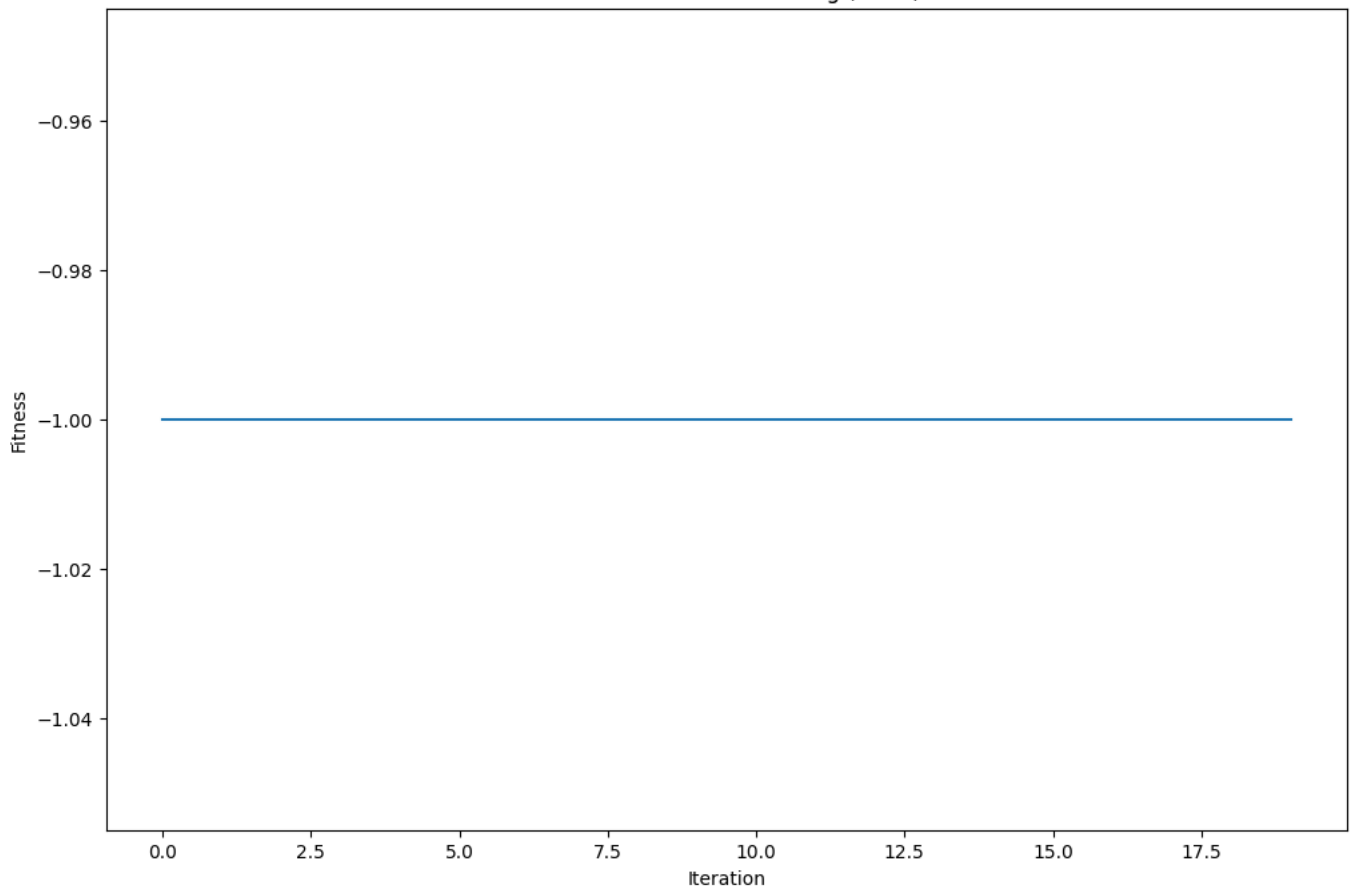Final Model Performance:

Accuracy: 1.0
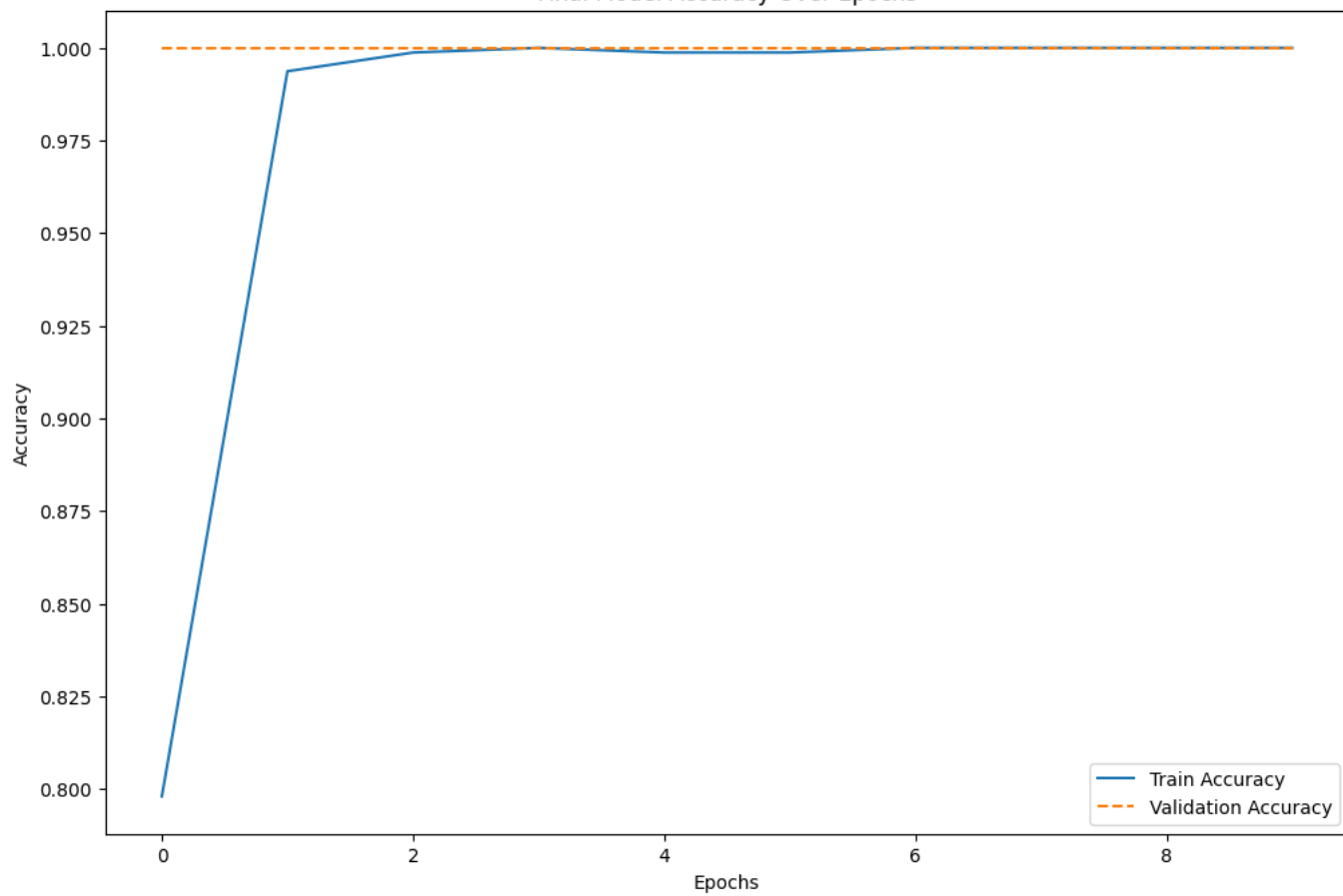
Precision: 1.0

Recall: 1.0
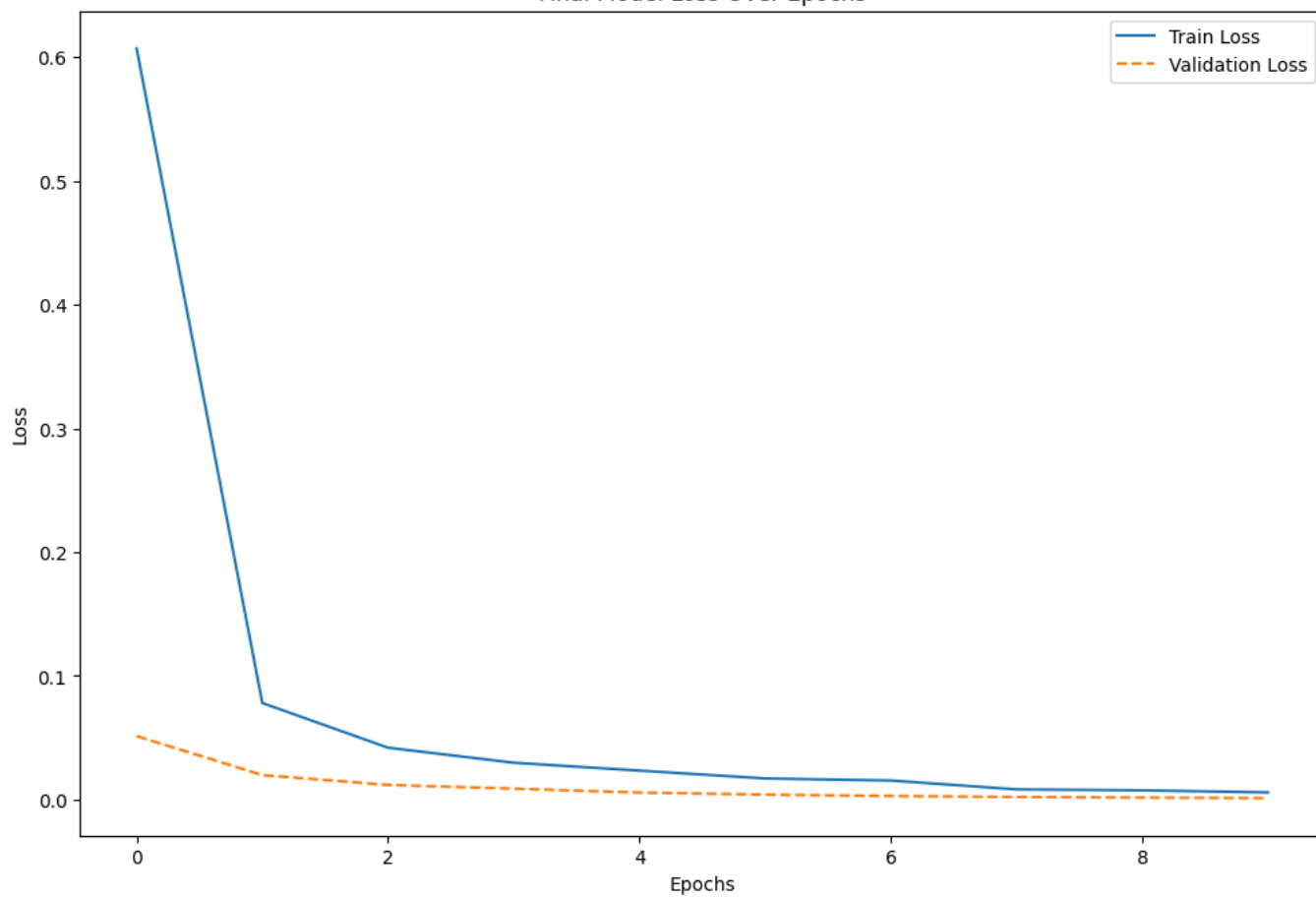
F1 Score: 1.0

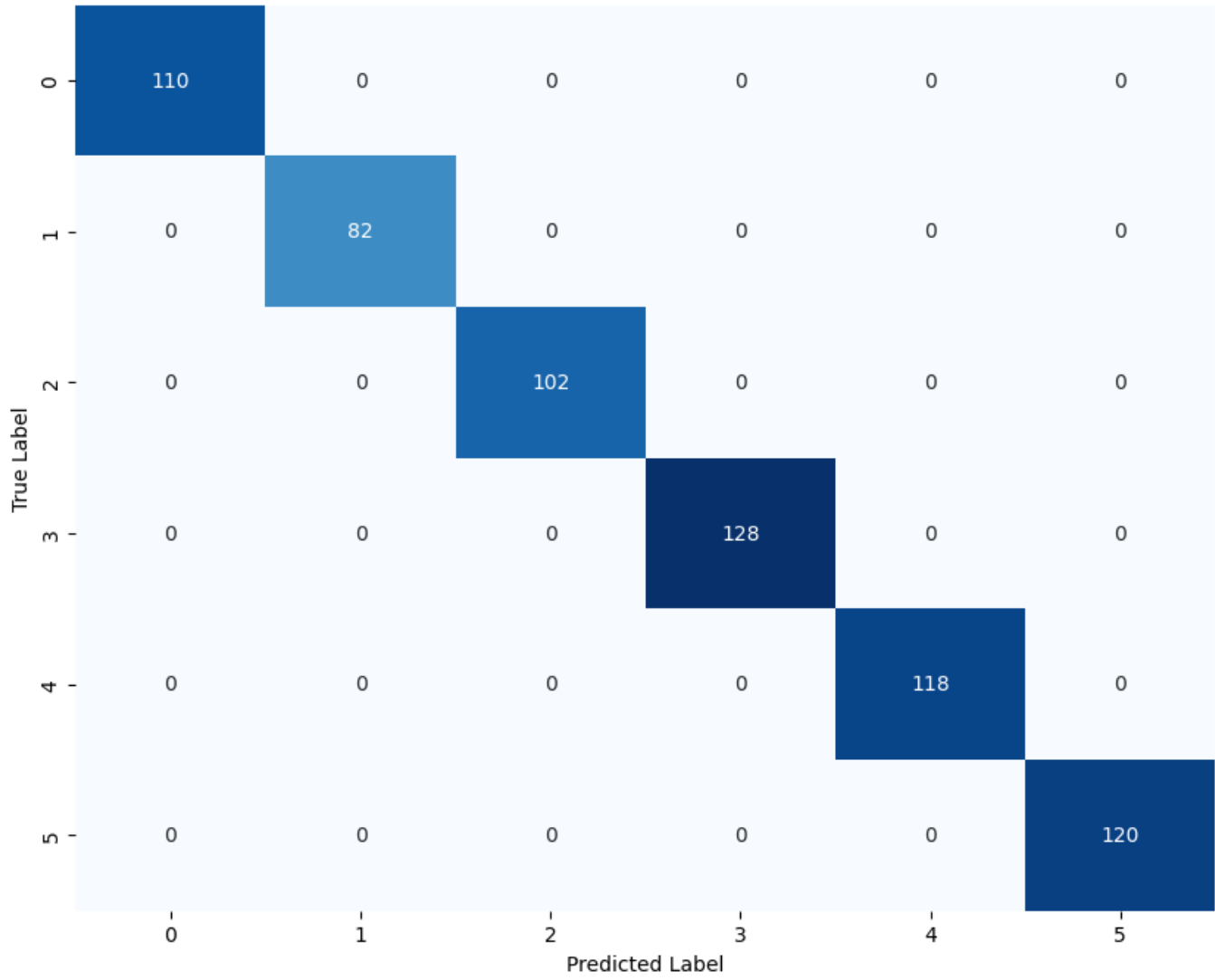Cohen's Kappa: 1.0

Fitness Curve Before Tuning (GWO)

Final Model Accuracy Over Epochs

Final Model Loss Over Epochs

Confusion Matrix - Final Model

ROC Curve - Final Model