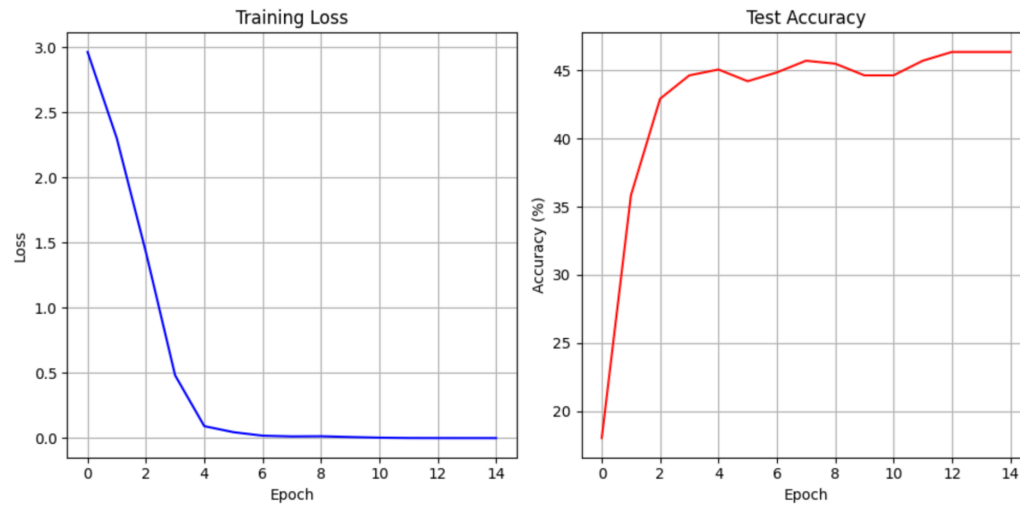
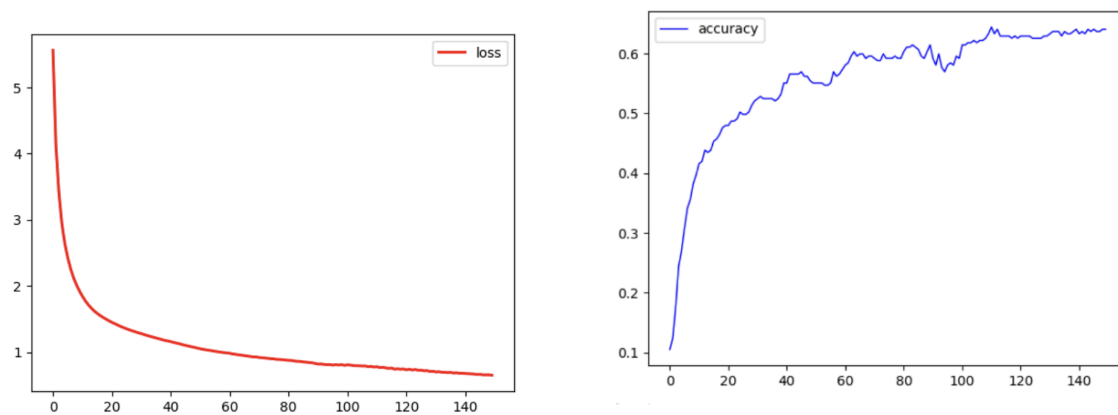


## Step 6: Model Reports

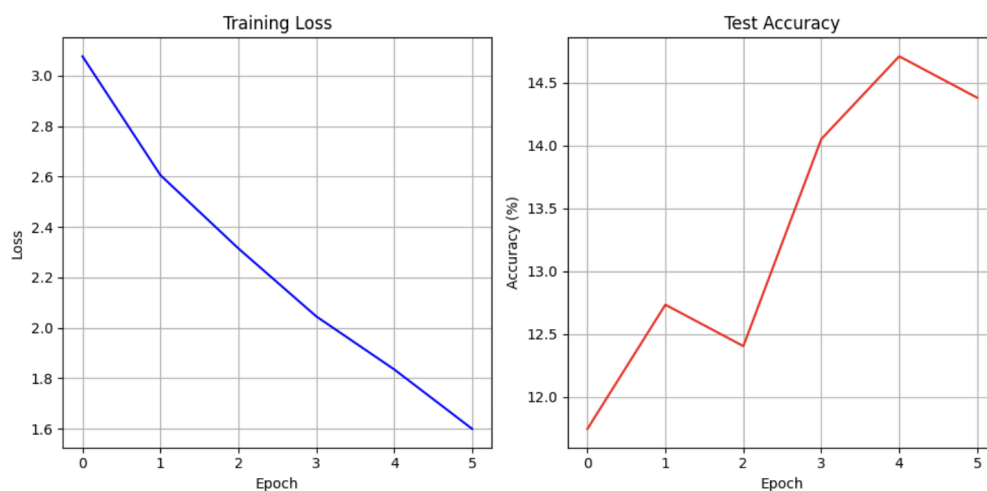
### CNN With Images



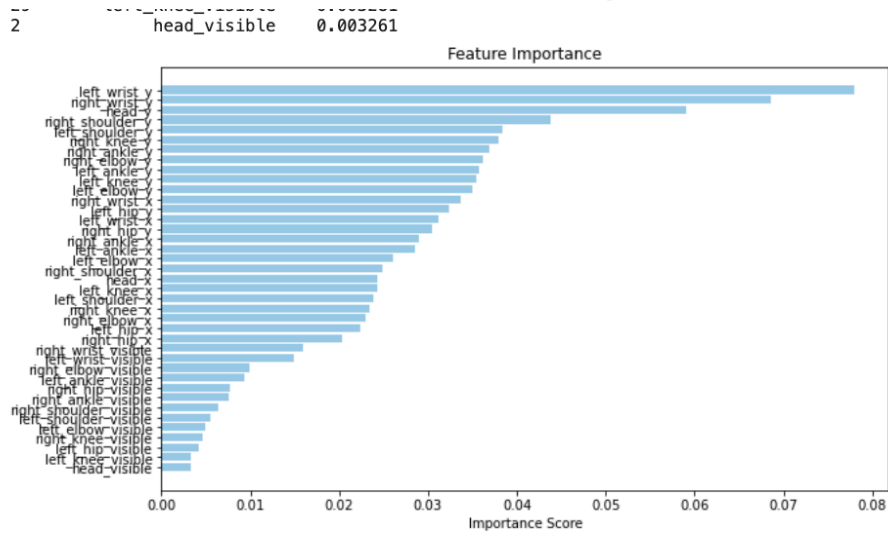
### CNN With Joint Annotations



### CNN With Both Joint Annotations and Images



## Random Forest Model with Feature Importances



```
4]: from sklearn.feature_selection import SelectFromModel

# select features using SelectFromModel
selector = SelectFromModel(clf, threshold='median')
selector.fit(X_train, y_train)

X_train_selected = selector.transform(X_train)
X_test_selected = selector.transform(X_test)

# selected feature names
selected_features = X_train.columns[selected_features]
print("Selected Features:", selected_features)
```

```
Selected Features: Index(['head_x', 'head_y', 'left_shoulder_y', 'right_shoulder_x',
                        'right_shoulder_y', 'left_elbow_x', 'left_elbow_y', 'right_elbow_y',
                        'left_wrist_x', 'left_wrist_y', 'right_wrist_x', 'right_wrist_y',
                        'left_hip_y', 'right_hip_y', 'left_knee_y', 'right_knee_y',
                        'left_ankle_x', 'left_ankle_y', 'right_ankle_x', 'right_ankle_y'],
                        dtype='object')
```

```
5]: # new RandomForestClassifier based on the selected features
new_clf = RandomForestClassifier(n_estimators=1350, random_state=37)
new_clf.fit(X_train_selected, y_train)

y_pred = new_clf.predict(X_test_selected)

accuracy = accuracy_score(y_test, y_pred)
print("Accuracy with Selected Features:", accuracy)
```

Accuracy with Selected Features: 0.8058419243986255

**\*\*training with selected features did not improve accuracy**

## Gradient Boost Model

Accuracy: 0.7835051546391752

Classification Report:

	precision	recall	f1-score	support
baseball_pitch	0.68	0.55	0.61	42
baseball_swing	0.69	0.86	0.76	43
bench_press	0.93	0.77	0.84	35
bowl	0.85	0.93	0.89	55
clean_and_jerk	0.89	0.77	0.83	22
golf_swing	0.69	0.74	0.71	42
jump_rope	0.80	0.80	0.80	20
jumping_jacks	0.81	0.79	0.80	28
pullup	0.87	0.90	0.88	50
pushup	0.90	0.87	0.88	53
situp	0.92	0.88	0.90	25
squat	0.88	0.84	0.86	58
strum_guitar	0.96	1.00	0.98	23
tennis_forehand	0.49	0.54	0.51	39
tennis_serve	0.59	0.55	0.57	47
accuracy			0.78	582
macro avg	0.80	0.79	0.79	582
weighted avg	0.79	0.78	0.78	582