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In [1]: import os
import pandas as pd
import fnmatch
import numpy as np

path = "C:/Users/c21012241/OneDrive - Cardiff University/Desktop/XAINET~1/C2ANDH~1/12FEAT~1/C2LR10~1"
#path = "C:/Users/c21012241/OneDrive - Cardiff University/Desktop/XAI Network Results/Hybrid Network Learning Rate Change/\
#13 Features - Continuous Presence of Crystals/Hybrid LR 0.0001 Epochs 400"
```

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In [2]: keywordConfusion = '*Confusion*'
all_Confusion = []

#Get all confusion matrix adn append to all_Confusion
for root, dirs, files in os.walk(path):
    for filename in fnmatch.filter(files, keywordConfusion):
        file_path = os.path.join(root, filename)
        all_Confusion.append(file_path)

# Sort all by date
all_Confusion.sort(key=os.path.getmtime)
```

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In [3]: Acc_Hybrid = pd.DataFrame()
Acc_C2 = pd.DataFrame()
Acc_12_Unconstrained = pd.DataFrame()
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In [4]: def toDf (run, runDF):
    for list in run:
        df = pd.read_csv(list, header=None)
        runDF.append(df)
    return runDF
```

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In [5]: run_1_Df = []
run_1_Df = toDf(all_Confusion, run_1_Df)
```

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In [6]: def splitAccuracies(constrainedC2RunAcc,hybridNetworkRunAcc,unconstrainedNetworkRunAcc, run):
    for df in run:
        a = df.iloc[12,1:2]
        b = df.iloc[12,11:12]
        c = df.iloc[12,21:22]
        constrainedC2RunAcc = pd.concat([constrainedC2RunAcc, a], axis=0,ignore_index=True)
        hybridNetworkRunAcc = pd.concat([hybridNetworkRunAcc, b], axis=0,ignore_index=True)
        unconstrainedNetworkRunAcc = pd.concat([unconstrainedNetworkRunAcc, c], axis=0,ignore_index=True)
    return constrainedC2RunAcc,hybridNetworkRunAcc,unconstrainedNetworkRunAcc
```

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In [7]: Acc_C2, Acc_Hybrid, Acc_12_Unconstrained = splitAccuracies(Acc_C2,Acc_Hybrid,Acc_12_Unconstrained, run_1_Df)
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In [8]: def meanValStdSem(valSet):
    valSet_means = np.mean((valSet.sum(axis=1)).to_numpy())
    valSet_std = (valSet.sum(axis=1)).to_numpy().std()
    valSet_sem = valSet_std / np.sqrt(np.size(valSet))

    return valSet_means, valSet_std, valSet_sem
```

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In [9]: Acc_C2_MeanStdSem = meanValStdSem(Acc_C2)
Acc_Hybrid_MeanStdSem = meanValStdSem(Acc_Hybrid)
Acc_Unconstrained_MeanStdSem = meanValStdSem(Acc_12_Unconstrained)
```

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In [10]: print("C2 Accuracy Mean, SD, SEM = ")
print(Acc_C2_MeanStdSem)
print("Hybrid Accuracy Mean, SD, SEM = ")
print(Acc_Hybrid_MeanStdSem)
print("Unconstrained Accuracy Mean, SD, SEM = ")
print(Acc_Unconstrained_MeanStdSem)
```

```
C2 Accuracy Mean, SD, SEM =
(81.94442500000001, 3.9577196405937674, 1.1424952499369403)
Hybrid Accuracy Mean, SD, SEM =
(88.88889166666667, 2.4845137637836805, 0.7172173451629191)
Unconstrained Accuracy Mean, SD, SEM =
(85.0, 6.309879085608531, 1.8215051943150378)
```