```
clc; clear
cd 'G:\Jiaxu Flashdrive Backup\code';
addpath 'G:\Jiaxu Flashdrive Backup\code\functions'
```

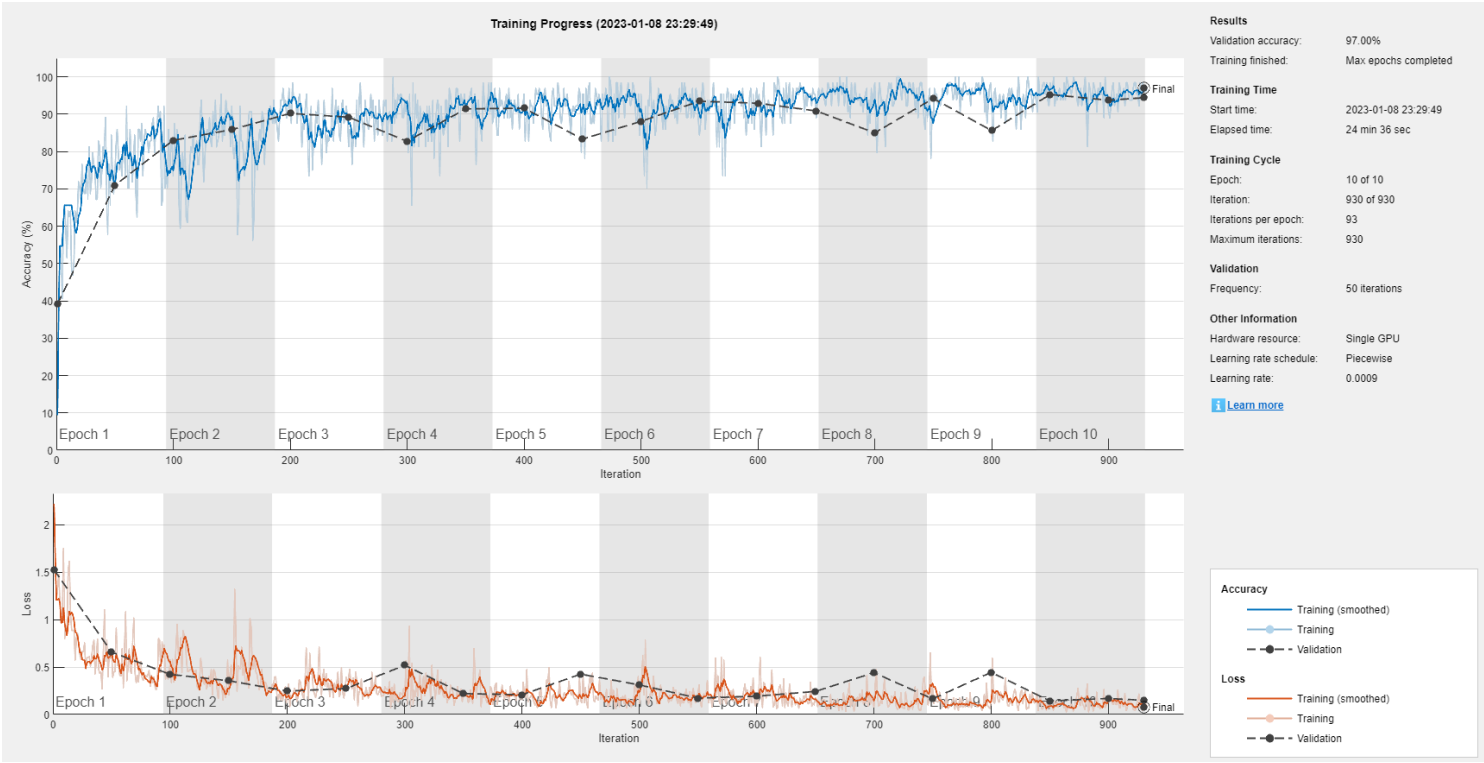
```
net = load("mobilenetV2_6_classes_untrained.mat");
% mobilenetV2_6va = net.mobilenetV2_6variable;
mobilenetV2_6var_0center = net.mobilenetV2_6va_0center;
fracTrainFiles = 0.8;
fracValFiles = 0.2;
training_imds = imageDatastore("G:\Machine Learning\NW_pitch_30_NWs_6_intervals\train", ...
    "IncludeSubfolders",true,...
    "LabelSource","foldernames");
shuffle_training_imds = shuffle(training_imds);
[trainImgs,validImgs] = splitEachLabel(shuffle_training_imds,fracTrainFiles,fracValFiles,"rando
numClasses = numel(categories(training_imds.Labels));
testing_imds = imageDatastore("G:\Machine Learning\NW_pitch_30_NWs_6_intervals\test" ...
    ,"IncludeSubfolders",true,...
    "LabelSource","foldernames");
```

```
options = trainingOptions('adam', ...
    'InitialLearnRate',0.001, ...
    'MaxEpochs',10, ...
    'Shuffle','every-epoch', ...
    'ValidationData',validImgs,...
    'MiniBatchSize',64,...
    'LearnRateSchedule','piecewise',...
    'LearnRateDropFactor',0.9,...
    'LearnRateDropPeriod',5,...
    'ValidationPatience',6,...
    'ExecutionEnvironment','multi-gpu',...
    'Plots','training-progress');

aug = imageDataAugmenter("RandScale",[0.8 1.3], ...
    "RandYTranslation",[-40 40], ...
    "RandXReflection",true, ...
    "RandYReflection",true);
auimds = augmentedImageDatastore([150 150 3],trainImgs,'DataAugmentation',aug);

% inputlayer = imageInputLayer([150,150,3],'Name','input','Normalization','none');
```

```
[mobilenet_6inv_0center,info] = trainNetwork(auimds,mobilenetV2_6var_0center,options);
```

```
Initializing input data normalization.
|=========================================================================================================================
|  Epoch  |  Iteration  |  Time Elapsed  |  Mini-batch  |  Validation  |  Mini-batch  |  Validation  |  Base Learni
|         |             |   (hh:mm:ss)   |   Accuracy   |   Accuracy   |     Loss     |     Loss     |      Rate
|=========================================================================================================================
|       1 |           1 |       00:00:05 |        9.38% |       39.13% |       2.2201 |       1.5242 |          0.0
|       1 |          50 |       00:01:19 |       73.44% |       70.93% |       0.6834 |       0.6586 |          0.0
|       2 |         100 |       00:02:35 |       73.44% |       83.00% |       0.5734 |       0.4228 |          0.0
|       2 |         150 |       00:03:52 |       92.19% |       85.87% |       0.2062 |       0.3558 |          0.0
|       3 |         200 |       00:05:08 |       90.62% |       90.20% |       0.2505 |       0.2469 |          0.0
|       3 |         250 |       00:06:26 |       81.25% |       89.20% |       0.3947 |       0.2739 |          0.0
```

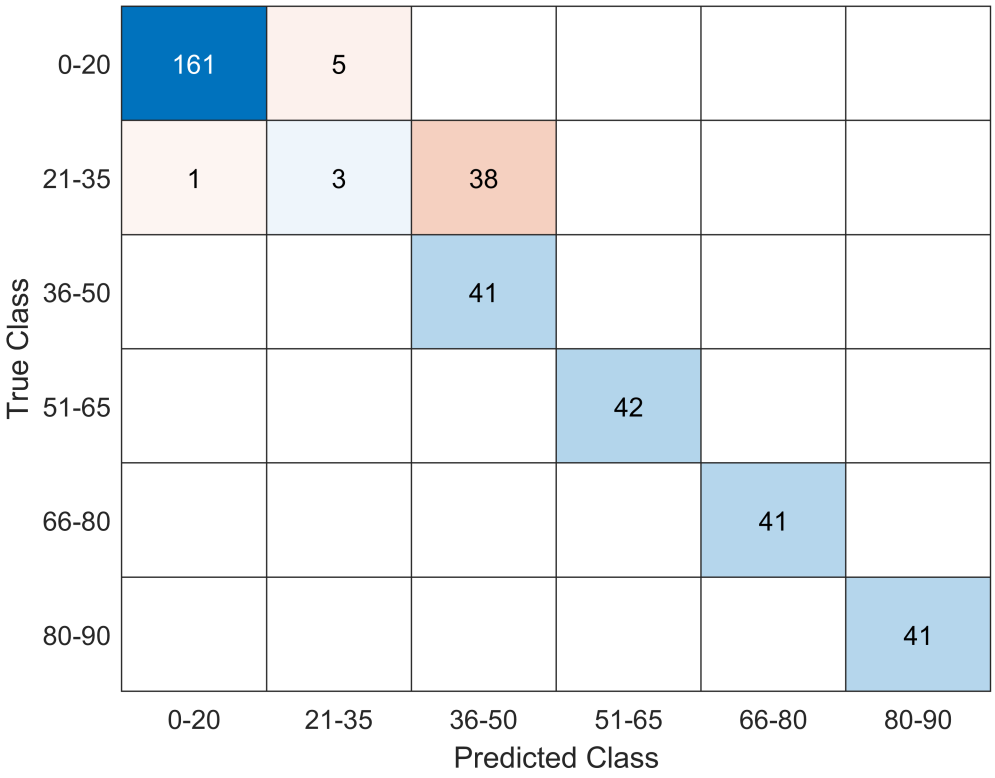
```
|       4 |         300 |       00:07:42 |       93.75% |       82.73% |       0.1765 |       0.5189 |          0.00
|       4 |         350 |       00:08:59 |       90.62% |       91.40% |       0.2142 |       0.2206 |          0.00
|       5 |         400 |       00:10:16 |       95.31% |       91.60% |       0.1569 |       0.2083 |          0.00
|       5 |         450 |       00:11:39 |       95.31% |       83.33% |       0.1440 |       0.4256 |          0.00
|       6 |         500 |       00:13:00 |       95.31% |       88.07% |       0.1142 |       0.3121 |          0.00
|       6 |         550 |       00:14:23 |       84.38% |       93.47% |       0.2355 |       0.1727 |          0.00
|       7 |         600 |       00:15:47 |       92.19% |       92.93% |       0.1797 |       0.1932 |          0.00
|       7 |         650 |       00:17:11 |       89.06% |       90.87% |       0.1784 |       0.2432 |          0.00
|       8 |         700 |       00:18:31 |       98.44% |       85.00% |       0.0768 |       0.4412 |          0.00
|       9 |         750 |       00:19:51 |       87.50% |       94.20% |       0.2888 |       0.1649 |          0.00
|       9 |         800 |       00:21:10 |       93.75% |       85.60% |       0.1682 |       0.4448 |          0.00
|      10 |         850 |       00:22:28 |       98.44% |       95.27% |       0.0582 |       0.1431 |          0.00
|      10 |         900 |       00:23:45 |       90.62% |       93.73% |       0.1843 |       0.1694 |          0.00
|      10 |         930 |       00:24:34 |       96.88% |       94.40% |       0.0906 |       0.1500 |          0.00
|=========================================================================================================================================
Training finished: Max epochs completed.
```




```
testpreds = classify(mobilenet_6inv_0center,testing_imds);
nnz(testpreds == testing_imds.Labels)/numel(testpreds)
```

```
ans = 0.8820
```

```
confusionchart(testing_imds.Labels,testpreds);
```


0-20
21-35
36-50
51-65
66-80
80-90
True Class
161
5
1
3
38
41
42
41
41
0-20
21-35
36-50
51-65
66-80
80-90
Predicted Class