```
    'L2Regularization', 7e-4,...
    'ValidationData', {X_valid, y_valid},...
    'Verbose', false,...
    'Plots', 'training-progress');

net = trainNetwork(X_train, y_train, layers, options);
```

Plot confusion matrix of train and validation data

```
figure(1)
y_pred = classify(net, X_train);
plotconfusion(y_train, y_pred);
title('Confusion Matrix of Train Data');

figure(2)
y_pred = classify(net, X_valid);
plotconfusion(y_valid, y_pred);
title('Confusion Matrix of Validation Data');
```

Plot confusion matrix of test data

```
figure(3)
y_pred = classify(net, X_test);
plotconfusion(y_test, y_pred);
title('Confusion Matrix of Test Data');
```

Convolutional neural network

```
layers1 = [imageInputLayer([28, 28, 1])
    convolution2dLayer([5 5], 6, 'Padding', 'same')
    tanhLayer
    convolution2dLayer([5 5], 6, 'Padding', 'same')
    tanhLayer
    averagePooling2dLayer([2 2], 'Padding', 'same', 'Stride', [2 2])
    convolution2dLayer([5 5], 6, 'Padding', 'same')
    tanhLayer
    fullyConnectedLayer(250)
    leakyReluLayer
    fullyConnectedLayer(10)
    softmaxLayer
    classificationLayer];

% layers1 = [imageInputLayer([28, 28, 1])
%     convolution2dLayer([28 28], 3, 'Padding', 'same')
%      ([14 14], 3, 'Padding', 'same', 'Stride', [2 2])
%     tanhLayer
%     fullyConnectedLayer(20)
%     reluLayer
%     fullyConnectedLayer(10)
```