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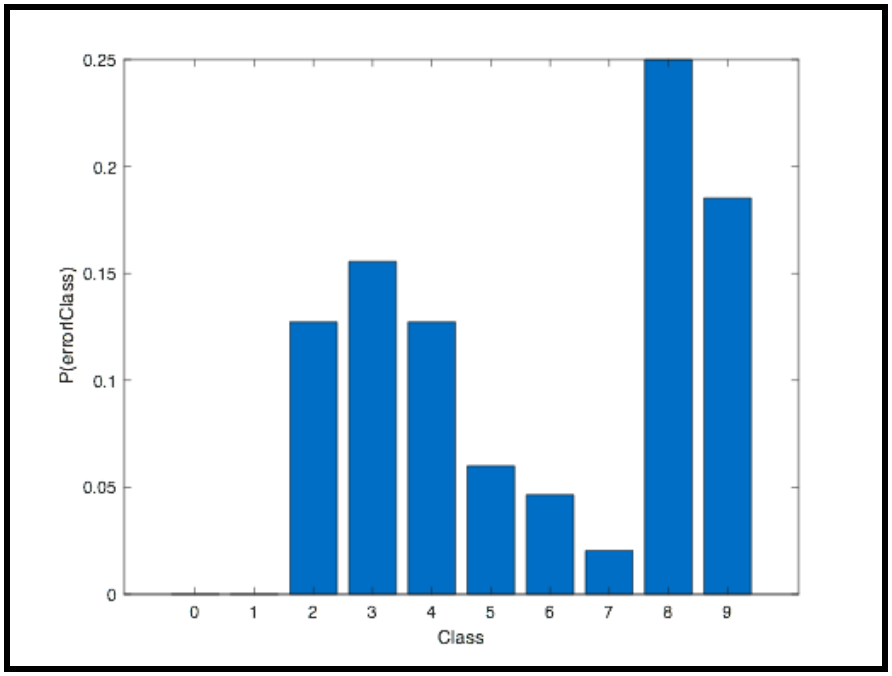
ECE 175A HW 2

1.

Class	0	1	2	3	4	5	6	7	8	9
Error rate	0	0	0.1273	0.1556	0.1273	0.0600	0.0465	0.0204	0.2500	0.1852

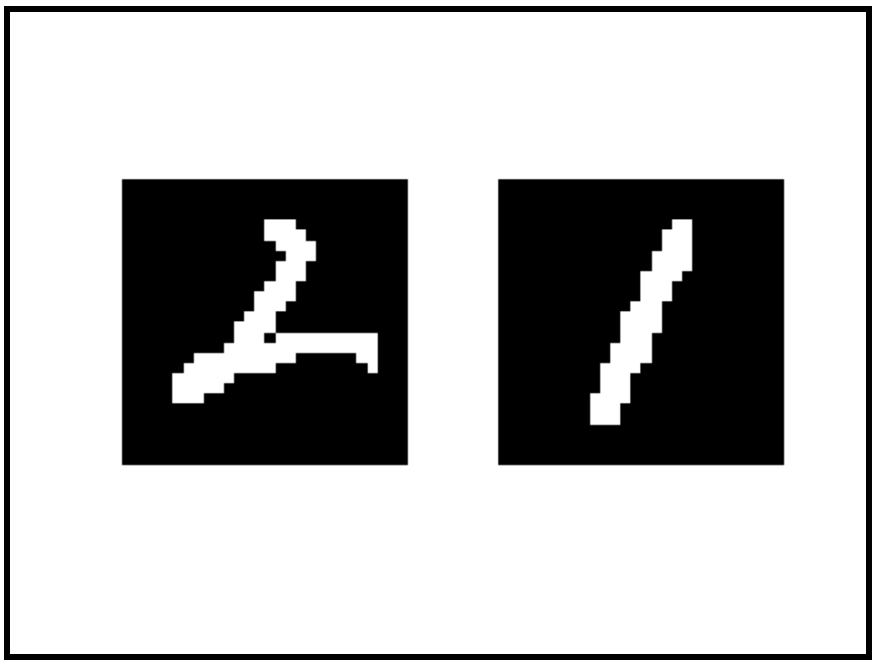
```
errorrate =

         0         0    0.1273    0.1556    0.1273    0.0600    0.0465    0.0204    0.2500    0.1852


totalerrorrate =

    0.0940
```

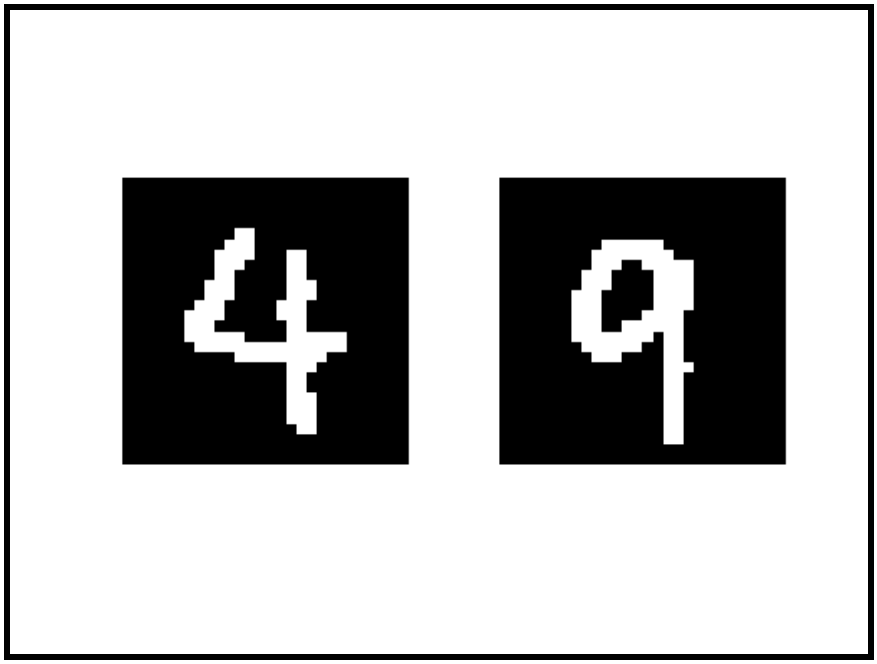


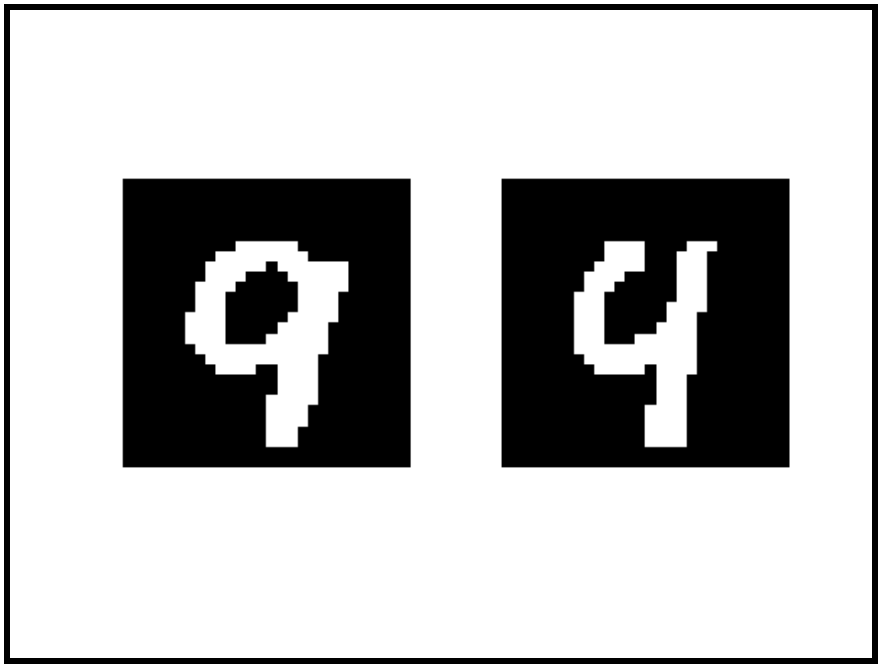
2.

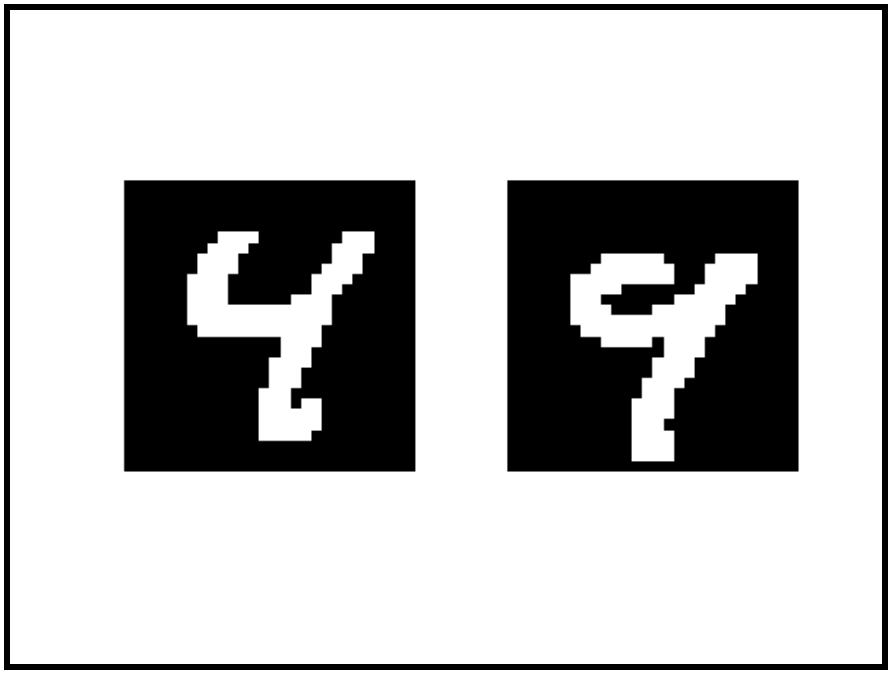
Total Error Rate＝**0.094** as indicated in the results above.

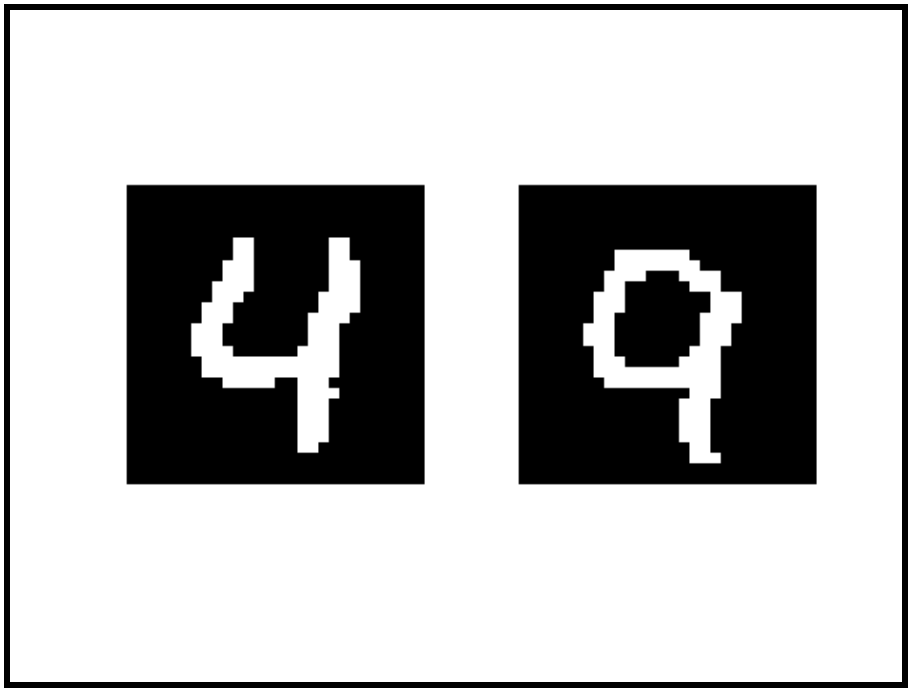
3.











The NN Classifier failed to perform because these images are similar to each other and in this case, we choose k=1, which is too small to classify them.

```
distance = zeros(5000,500);
for i = 1:500            %%classify ImageTrain
    for j = 1:5000
       diff = imageTrain(:,:,j) - imageTest(:,:,i);
       square=diff.^2;
       add = sum(sum(square));
       d=sqrt(add);
       distance(j,i) = d;
    end
end
[dmin,index]=min(distance);
for i=1:500
    class(i)=labelTrain(index(i));
end

errorrate=zeros(1,10); %%calculate the error rate for each class
error=zeros(1,10);
for c=0:9
x=find(labelTest==c);
for j=1:length(x)
if class(x(j))~=labelTest(x(j))
    error(c+1)=error(c+1)+1;
end
end
 errorrate(c+1)=error(c+1)/length(x);
end

totalerrorrate=sum(error)/500; %% calculate the total error rate

bar(0:9,errorrate)   %%plot the error rate for each class
xlabel('Class')
ylabel('P(error|Class)')

counter=0;           %%plot the 5 misclassified images and their closest
images
for i=1:500
    if labelTest(i)~= class(i)
    subplot(1,2,1);
    imshow(imageTest(:,:,i));
    subplot(1,2,2);
    imshow(imageTrain(:,:,index(i)));
    counter=counter+1;
    if counter==5
        break
    end
    end
```

```
    end
```