ROC curve

Author: CARLOS M N

DNI: XXXXXXXX-X

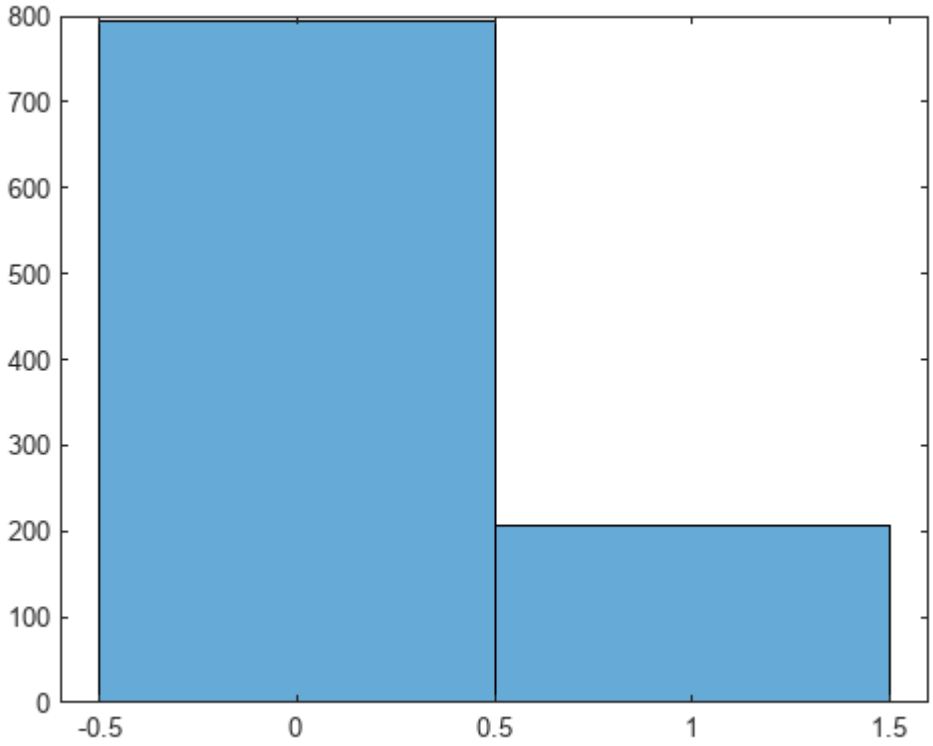
Clear workspace

```
clear all; clc; close all;
```

Initialize variables

values: variable to reconstruct (dichotomical: 0/1)

```
proportion = 0.8;
values = rand(1000,1) > proportion;
histogram(values)
```



scores: column vector of values between 0 and 1

```
scores = rand(1000,1);
```

threshold: row vector of evenly spaced values

```
threshold = linspace(0,1,200);
```

Compute matrix

```
prediction = scores>threshold;
```

Get TP, TN, FP, FN matrixes

```
truepositive = prediction & values;
TP = sum(truepositive,1);

falsepositive = prediction & ~values;
FP = sum(falsepositive,1);

truenegative = ~prediction & ~values;
TN = sum(truenegative,1);

falsenegative = ~prediction & values;
FN = sum(falsenegative,1);

% Check
max(sum([TP; FP; TN; FN],1))
```

```
ans = 1000
```

```
min(sum([TP; FP; TN; FN],1))
```

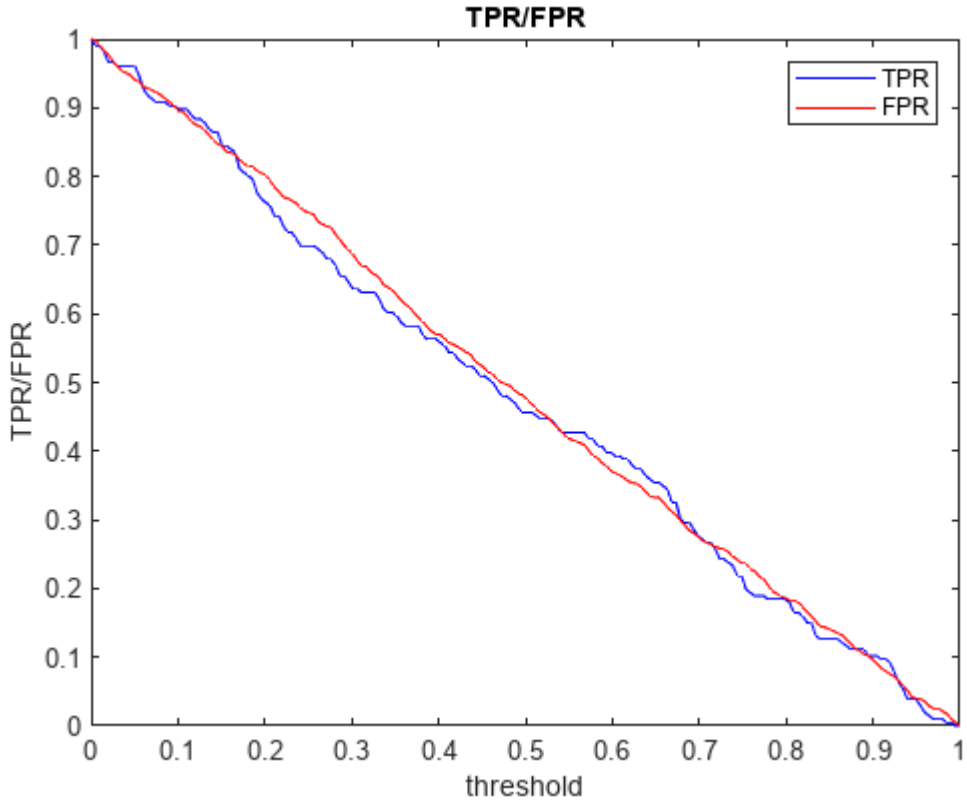
```
ans = 1000
```

Compute TPR and FPR and print

```
TPR = TP./(TP+FN);
FPR = FP./(FP+TN);
```

plot

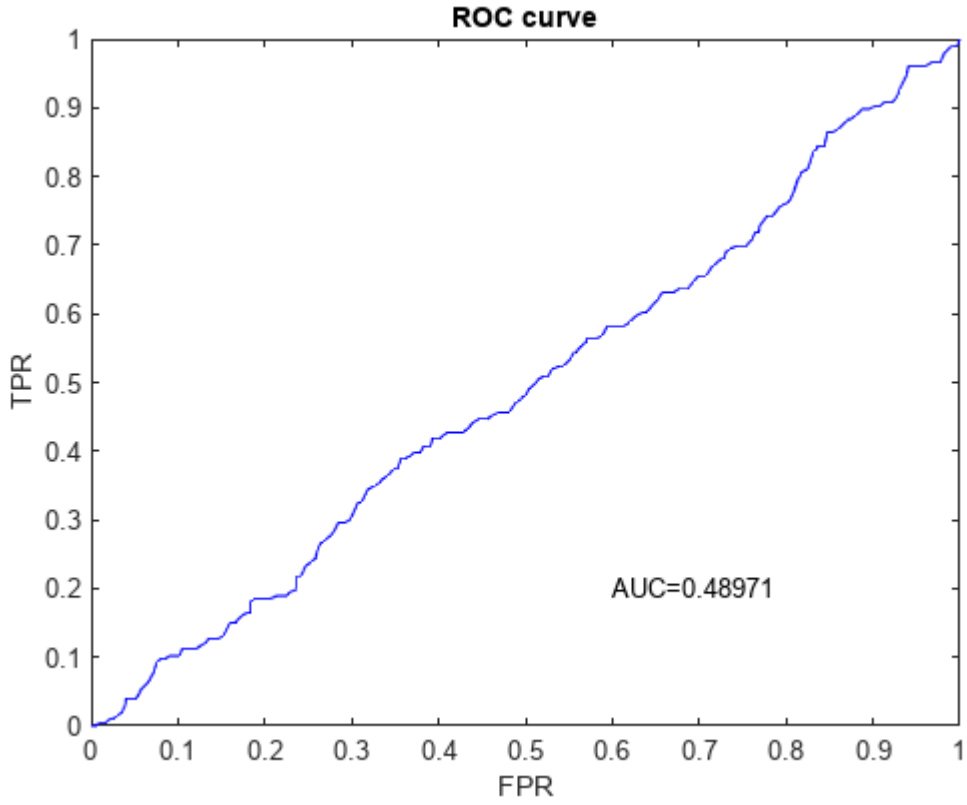
```
figure(2)
plot(threshold,TPR,'b')
hold on
plot(threshold,FPR,'r')
hold off
legend('TPR','FPR')
xlabel('threshold')
ylabel('TPR/FPR')
title('TPR/FPR')
% saveas(gcf,'04_ROC/TPR_FPR_rand.png')
```



ROC curve

```
AUC = 0;
for ii=2:size(FPR,2)
    AUC = AUC + abs((FPR(ii)-FPR(ii-1)))*(TPR(ii)+TPR(ii-1))/2;
end

figure(3)
plot(FPR,TPR,'b')
xlabel('FPR')
ylabel('TPR')
text(0.6,0.2,strcat('AUC=',num2str(AUC)))
title('ROC curve')
% saveas(gcf,'04_ROC/ROC_rand.png')
```


ROC curve
TPR
FPR
AUC=0.48971
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1