ECE 361 Project Part 1

Group # 13

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Name2

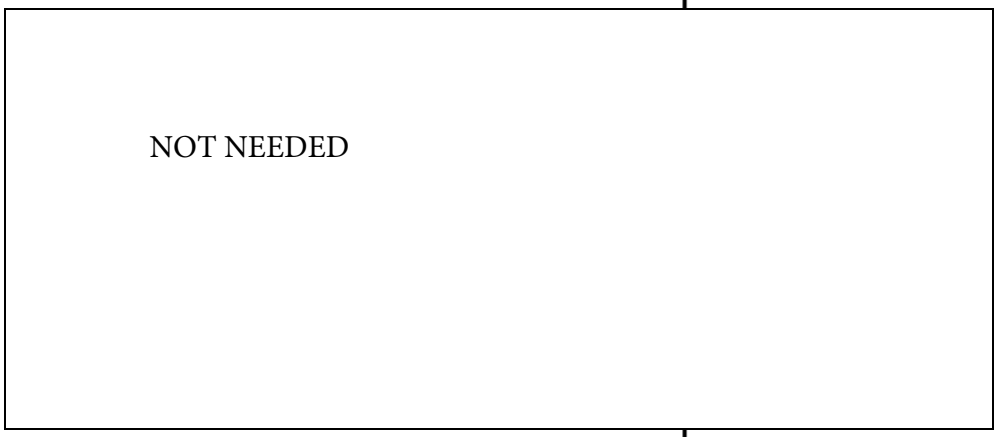
Name 3

Summary [no more than 10 lines]

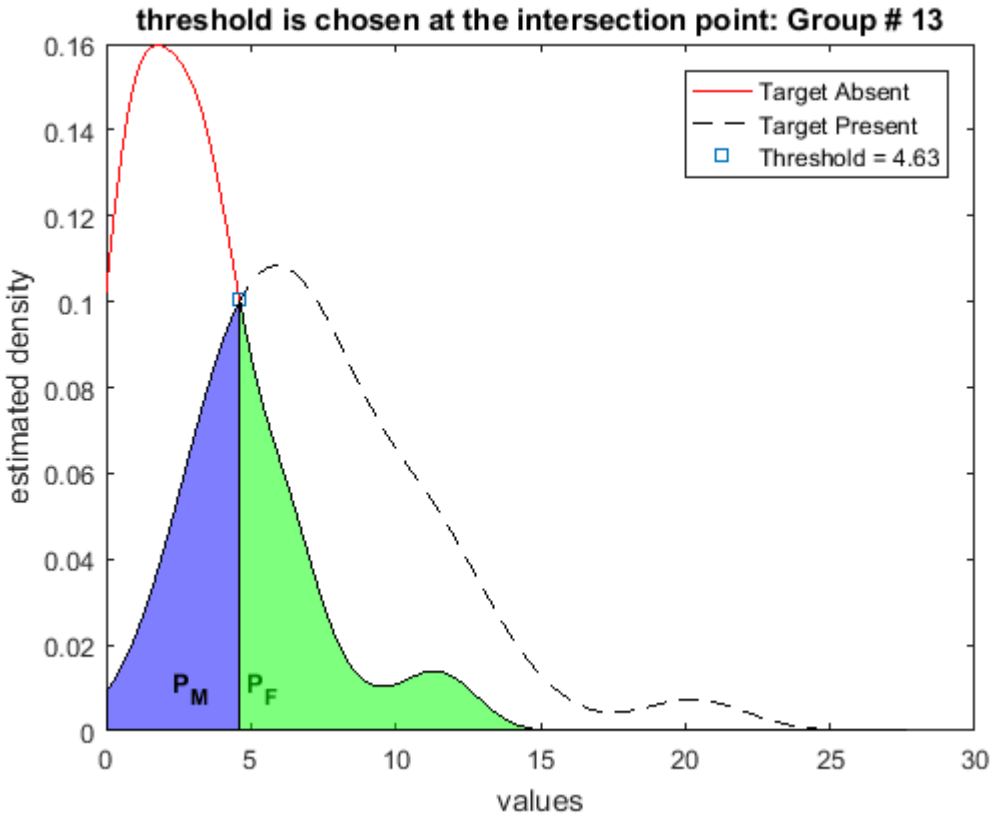
Report due, Week #8, Wednesday 5:00 PM as a single .pdf document e-mailed to shankapm@drexel.edu

Group # 13

Target Absent							Target Present		
0.418	2.346	3.695	3.865	0.215	0.015	11.364	4.658	9.423	3.681



4.162	2.836	0.834	1.025	9.015	1.264	4.351	11.609	7.808	4.086


threshold is chosen at the intersection point: Group # 13
Target Absent
Target Present
Threshold = 4.63
estimated density
values
P_M
P_F
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
5
10
15
20
25
30

Group #13

Confusion Matrix: Threshold (interstion) = 4.63

Data Collected	Target Detected	Target Not Detected	Total Samples
Target Absent	16	54	70
Target Present	24	6	30
Total Samples	40	60	100

Errors are circled

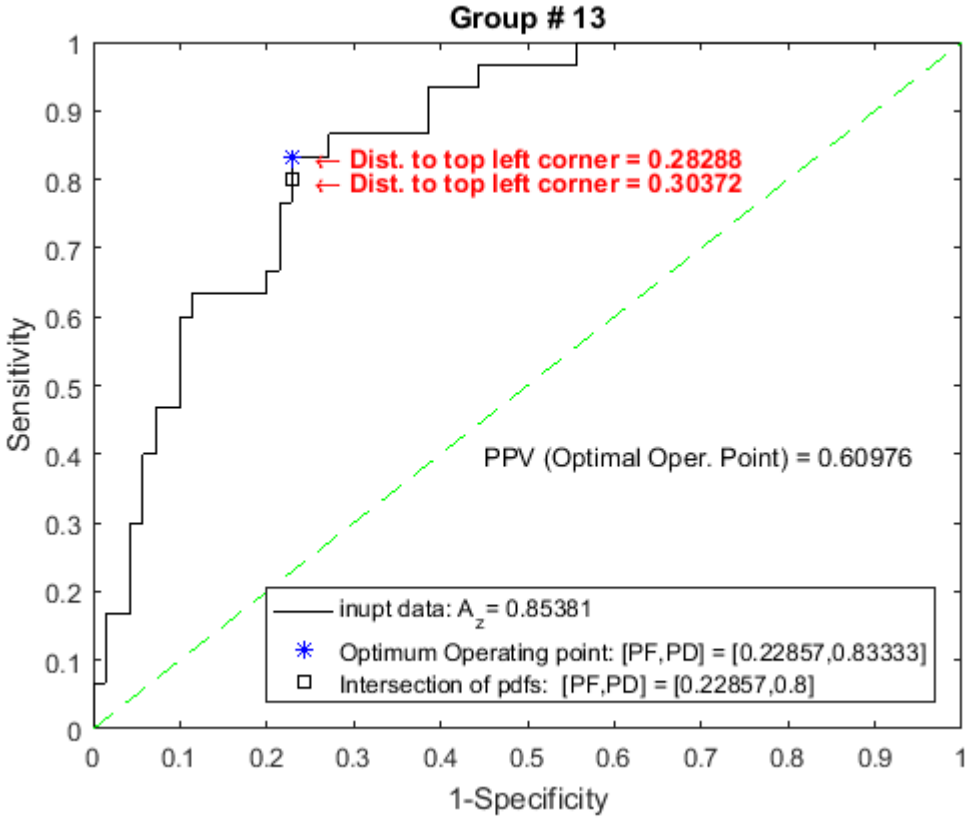
Transition Matrix: Threshold (intersection) = 4.63

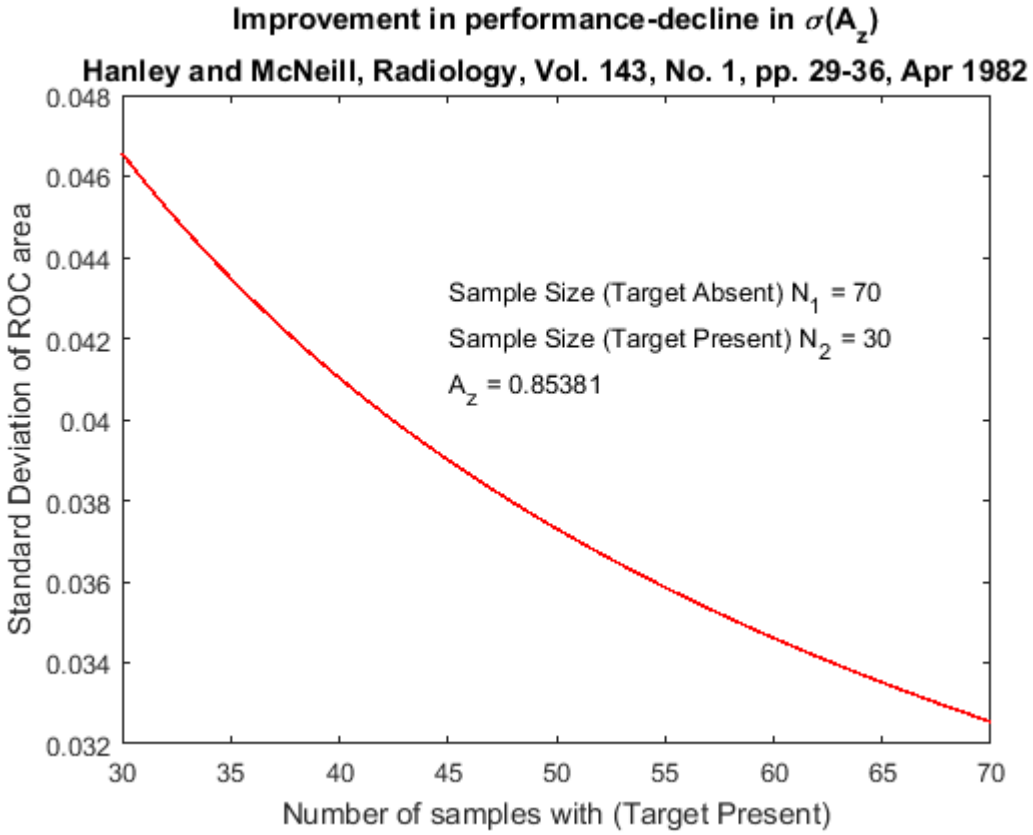
$$T_X = \begin{bmatrix} P(NotDetected|Absent) & P(NotDetected|Present) \\ P(Detected|Absent) & P(Detected|Present) \end{bmatrix}$$

$$T_X = \begin{bmatrix} 1-P_F & P_M \\ P_F & 1-P_M \end{bmatrix} \Rightarrow \begin{bmatrix} \frac{27}{35} & \frac{1}{5} \\ \frac{8}{35} & \frac{4}{5} \end{bmatrix} \Rightarrow \begin{bmatrix} 0.7714 & 0.2 \\ 0.2286 & 0.8 \end{bmatrix}$$

$P_F = \frac{8}{35}$ = 0.22857 $P_M = \frac{1}{5}$ = 0.2 $\text{PPV} = \frac{3}{5}$ = 0.6

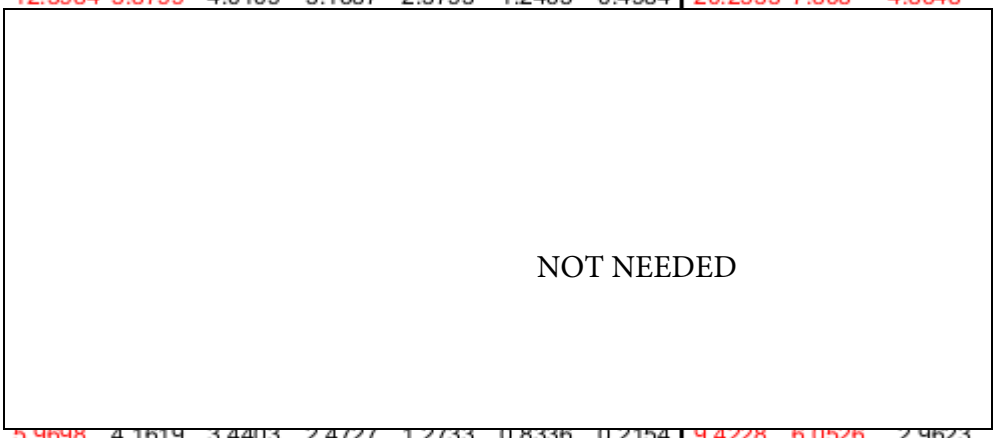
p m shankar


Group # 13
Sensitivity
1-Specificity
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
← Dist. to top left corner = 0.28288
← Dist. to top left corner = 0.30372
PPV (Optimal Oper. Point) = 0.60976
inupt data: A_z = 0.85381
Optimum Operating point: [PF,PD] = [0.22857,0.83333]
Intersection of pdfs: [PF,PD] = [0.22857,0.8]


Improvement in performance-decline in $\sigma(A_z)$
Hanley and McNeill, Radiology, Vol. 143, No. 1, pp. 29-36, Apr 1982
Standard Deviation of ROC area
0.048
0.046
0.044
0.042
0.04
0.038
0.036
0.034
0.032
30
35
40
45
50
55
60
65
70
Number of samples with (Target Present)
Sample Size (Target Absent) N_1 = 70
Sample Size (Target Present) N_2 = 30
A_z = 0.85381

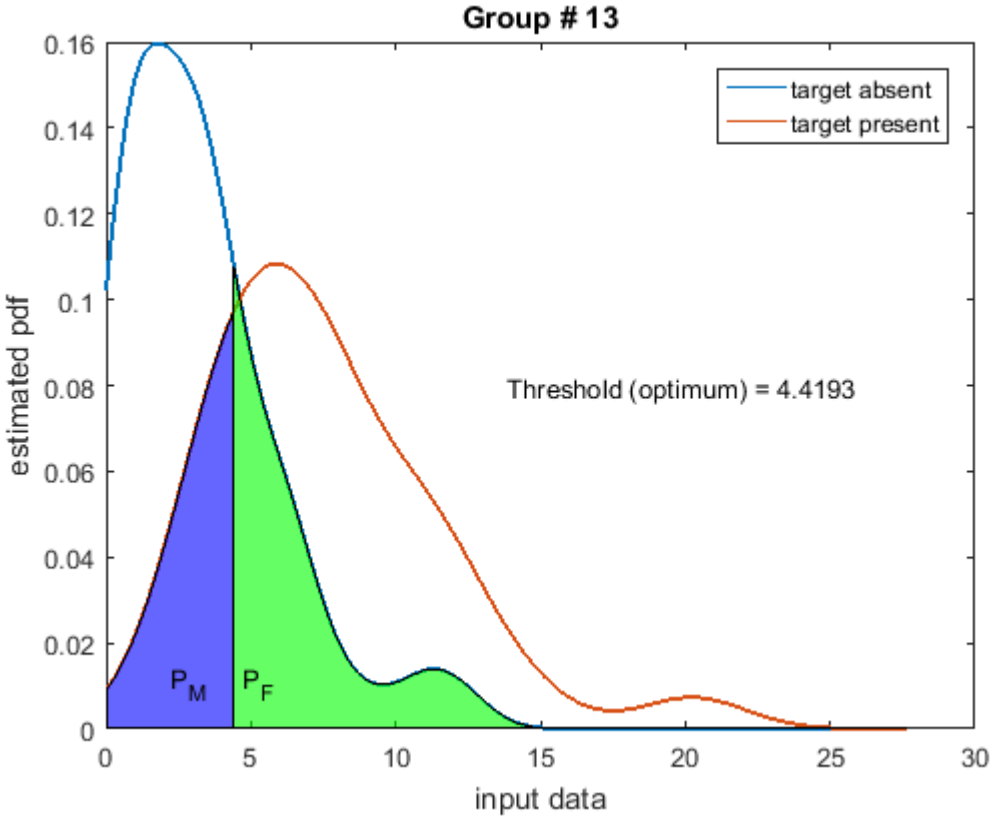
Sorted Group # 13: OPtimal Threshold = 4.4193

Target Absent							Target Present		
12.3984	5.8799	4.0109	3.1687	2.3793	1.2465	0.4984	20.2533	7.808	4.8648



5.9698	4.1619	3.4403	2.4727	1.2733	0.8336	0.2154	9.4228	6.0526	2.9623
5.9605	4.0373	3.3658	2.3937	1.2642	0.5266	0.0147	8.3007	5.0867	2.3974

values > threshold in red: 16 for TARGET ABSENT & 25 for TARGET PRESENT


Group # 13
target absent
target present
Threshold (optimum) = 4.4193
P_M
P_F
estimated pdf
input data
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
5
10
15
20
25
30

Group #13

Confusion Matrix: Threshold (optimum) = 4.4193

Data Collected	Target Detected	Target Not Detected	Total Samples
Target Absent	16	54	70
Target Present	25	5	30
Total Samples	41	59	100

Errors are circled

Transition Matrix: Threshold (optimum) = 4.4193

$$T_X = \begin{bmatrix} P(NotDetected|Absent) & P(NotDetected|Present) \\ P(Detected|Absent) & P(Detected|Present) \end{bmatrix}$$

$$T_X = \begin{bmatrix} 1-P_F & P_M \\ P_F & 1-P_M \end{bmatrix} \Rightarrow \begin{bmatrix} \frac{27}{35} & \frac{1}{6} \\ \frac{8}{35} & \frac{5}{6} \end{bmatrix} \Rightarrow \begin{bmatrix} 0.7714 & 0.1667 \\ 0.2286 & 0.8333 \end{bmatrix}$$

$P_F = \frac{8}{35}$ = 0.22857 $P_M = \frac{1}{6}$ = 0.16667 $\text{PPV} = \frac{25}{41}$ = 0.60976

p m shankar