Intelligent Systems: Reasoning and Recognition

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Performance Evaluation Metrics

Two classes, C_1 and C_2 are to be recognized from a feature, X, with $N=4$ possible values. You provided with the following histograms for from $M=40$ samples, and asked to construct a detector $d(g(x))$ for class C_1 using a ratio of histograms such that $d(g(x))=1$ for class 1 and $d(g(x))=0$ for class 2.

x	1	2	3	4
$h_1(x)$	2	4	6	8
$h_2(x)$	8	6	4	2

a) Define a detection function $d(g(x))$ for class 1 using a ratio of histograms.

b) Determine the values of bias, B_x, for which $g(x) + B_x = 0$ for each value of x.

c) Determine the TPR and FPR rates for each value B_x using the histograms.

d) Construct an ROC curve by plotting the TPR and FPR rates for each value B_x.

e) Give the Precision and Recall for this detector using the histogram.