ECS 132 Quiz 2

Geoffrey Mohn

TOTAL POINTS

35 / 35

QUESTION 1

1 Question 1 12 / 12

✓ **+ 6 pts** *y=0.93x+.38, Linear*

✓ **+ 6 pts** *1/(1+e^-(.93+0.38x), Logistic*

+ 3 pts Linear, Math error

+ 3 pts Logistic, Math Error

QUESTION 2

2 Question 2 9 / 9

✓ **+ 9 pts** *Correct*

+ 5 pts N values are wrong

+ 0 pts Wrong

+ 6 pts Pk values are wrong

+ 7 pts N values are wrong

+ 6 pts Have to evaluate for N values

+ 3 pts N values missing

+ 4 pts Values are wrong

+ 3 pts N values are wrong

QUESTION 3

3 Question 3 6 / 6

✓ **+ 2 pts** *a) Stdev = 1*

✓ **+ 2 pts** *bi) 0.707*

✓ **+ 2 pts** *bii) .577*

QUESTION 4

4 Question 4 8 / 8

✓ **+ 8 pts** *Correct*

+ 0 pts Wrong

+ 3 pts Partially correct

+ 4 pts Decision tree missing

+ 4 pts Decision rule is wrong

+ 4 pts Decision rule is missing

+ 1 pts Wrong

+ 7 pts x<1.2 and y>1.2 = Circle

+ 4 pts Partially correct, if conditions has to be reverse.

+ 5 pts Decision rule is missing

+ 4 pts Decision tree is wrong

+ 2 pts Wrong

gradescope

1

x	-1	1	2	4	6	7
y	-1	2	3	3	5	8

$\Sigma x = 19 \quad \Sigma y = 20 \quad \Sigma x^2 = 105 \quad \Sigma y^2 = 110$
$\Sigma xy = 107$

$$\beta_0 = \frac{(20 \cdot 105 - 19 \cdot 107)}{6 \cdot 105 - 19^2} = \frac{67}{269} = .249$$

$$\beta_1 = \frac{6 \cdot 107 - 19 \cdot 20}{6 \cdot 105 - 19^2} = \frac{262}{269} = .974$$

$y = .249 + .974x$
let $x = 5$
$y = 5.119$

b) $$Z = \frac{e^{(.249 + .974x)}}{1 + e^{(.249 + .974x)}}$$

x	-1	1	2	4	6	7
Z	.326	.773	.900	.984	.998	.999

range of Z vals $0 \leq Z \leq 1$
Logistic Regression

1

$$y = .249 + .974x$$

2

x	y
−1	−1
1	2
2	3
4	3
6	5
7	8

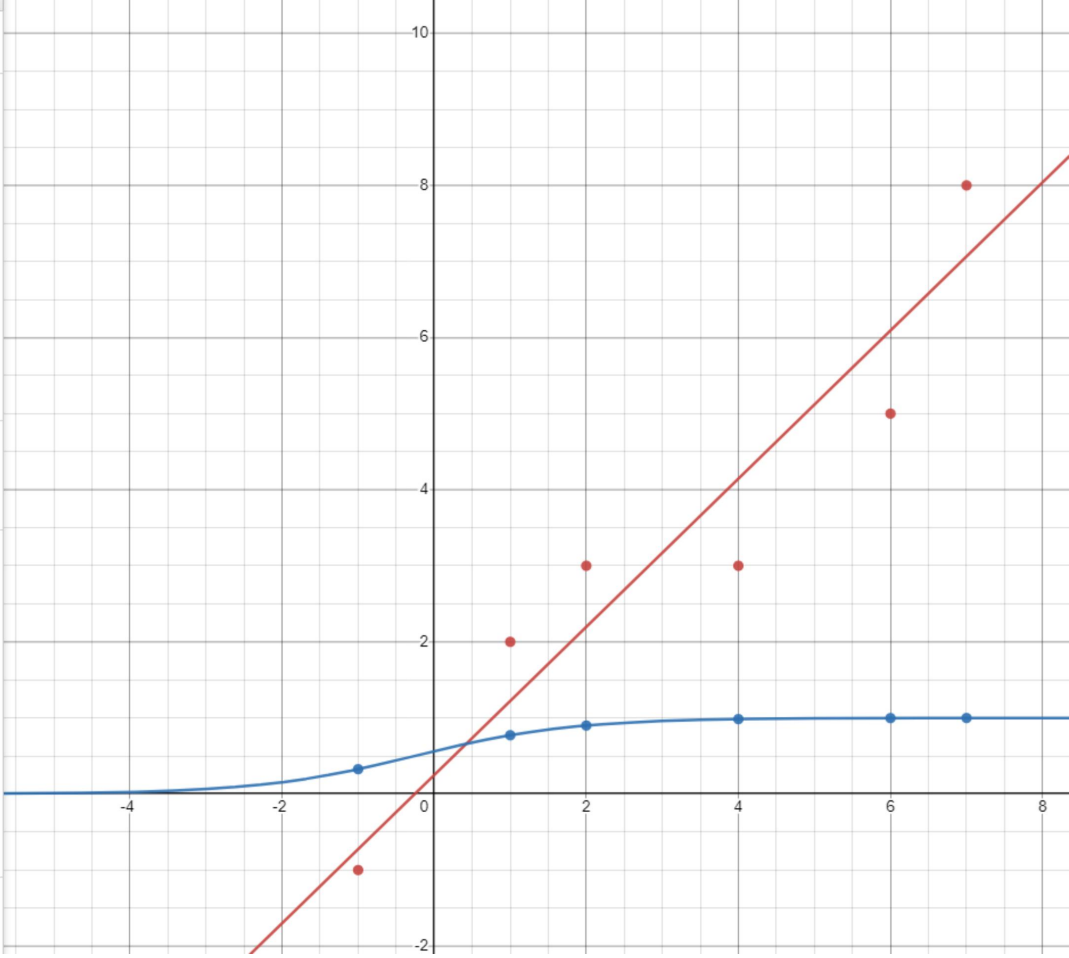
3

$$z = \frac{e^{(.249+.974x)}}{1+e^{(.249+.974x)}}$$

4

x	z
−1	0.3262929
1	0.77259106
2	0.89997979
4	0.98440366
6	0.99774647
7	0.99914794

5



1 Question 1 12 / 12

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2 tossed 6 times let X_k be heads

k	0	1	2	3	4	5	6
P_k	1	6	15	20	15	6	1
$N(\eta,\sigma)$	.016	.085	.233	.325	.233	.085	.016

$\sigma = \frac{1}{2}\sqrt{6} = 1.224$

$\eta = \sum_{i=1}^{6} x_i$

$\eta = \frac{6}{2} = 3$

$$N(\eta,\sigma) = \frac{1}{1.224\sqrt{2\pi}} e^{\left(\frac{-(k-3)^2}{2(1.224)^2}\right)}$$

2 Question 2 9 / 9

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$\mu = 70kg \quad \sigma = 10kg$

Central Limit Theorem

$\mu_{\bar{x}} = \mu$

$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$

a) $\frac{10}{\sqrt{100}} = 1 \quad \mu = 70$

b) $\frac{10}{\sqrt{200}} = .707 \quad \mu = 70$

$\frac{10}{\sqrt{300}} = .577 \quad \mu = 70$

3 Question 3 6 / 6

✓ **+ 2 pts** *a) Stdev = 1*

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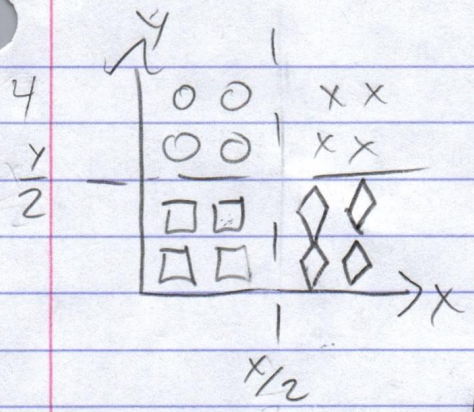
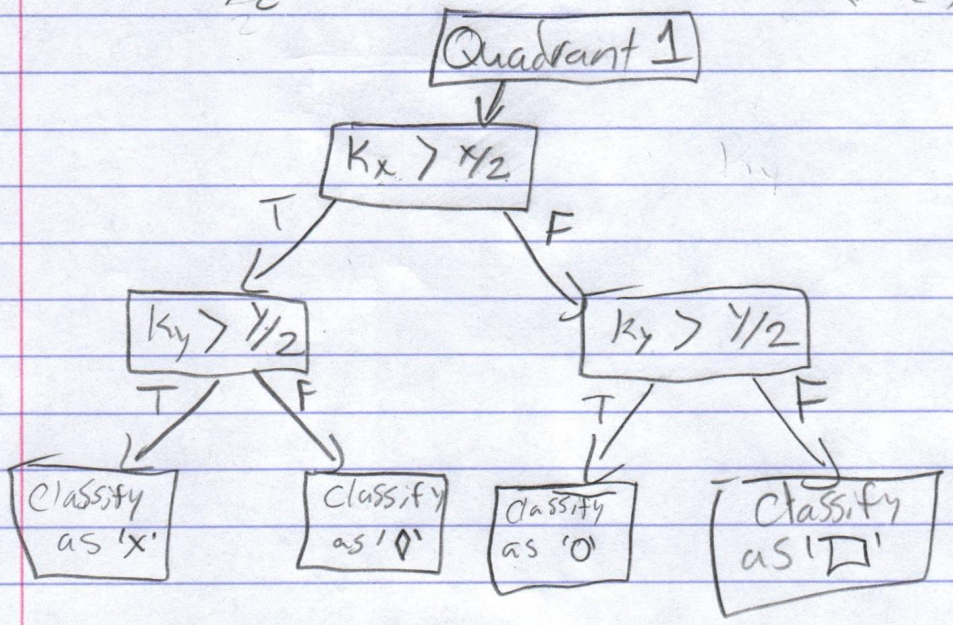


Linear multiclass

One vs rest? 4 binary class

- ○ vs (x, □, ◇)
- □ vs (○, x, ◇)
- x vs (○, □, ◇)
- ◇ vs (○, □, x)



b) if $K_x > \frac{x}{2}$ & $K_y > \frac{y}{2}$ then 'x'

if $K_x > \frac{x}{2}$ & not $K_y > y/2$ then '◇'

if not $K_x > \frac{x}{2}$ & $K_y > y/2$ then '○'

if not $K_x > \frac{x}{2}$ & not $K_y > y/2$ then '□'

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