

AIL 7024

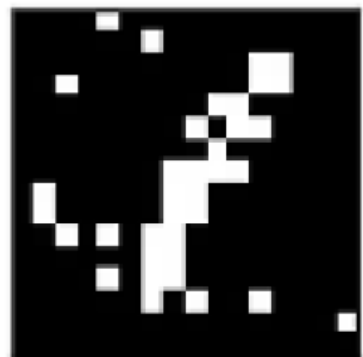
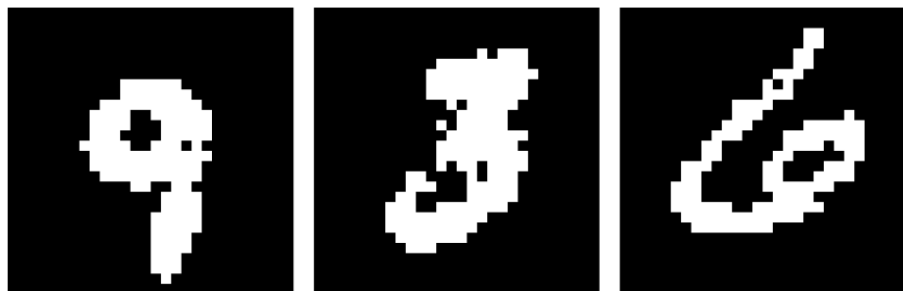
Machine Learning

Sem 1, 2026-27

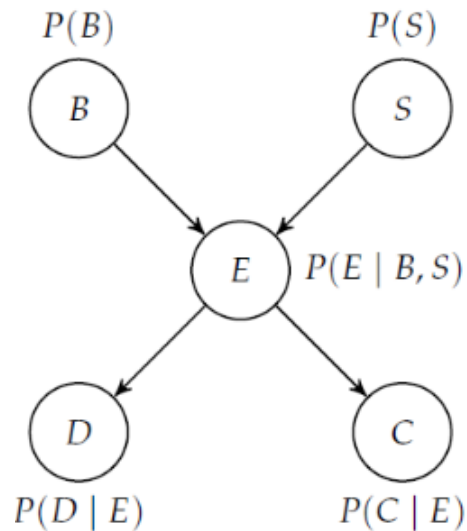
Naïve Bayes

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MNIST



Bayes Net: Satellite Problem



$$2^5 - 1 = 31$$

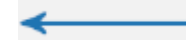
$$1 + 1 + 4 + 2 + 2 = 10$$

$$P(b^1 | d^1, c^1) = \frac{P(b^1, d^1, c^1)}{P(d^1, c^1)}$$

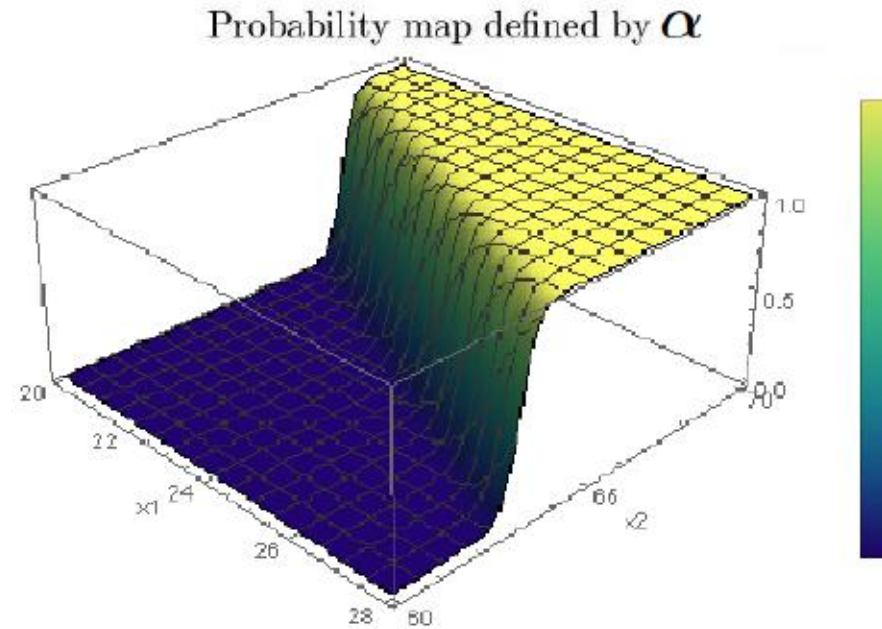
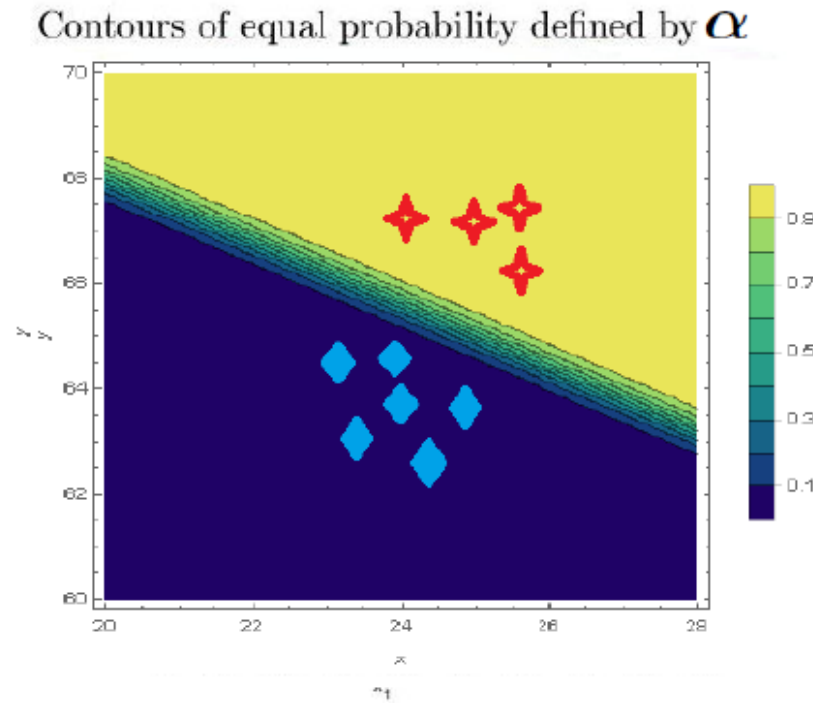
$$P(b^1, d^1, c^1) = \sum_s \sum_e P(b^1, s, e, d^1, c^1)$$

$$P(b^1, s, e, d^1, c^1) = P(b^1)P(s)P(e | b^1, s)P(d^1 | e)P(c^1 | e)$$

B	S	E	D	C
0	0	1	1	0
0	0	0	0	0
1	0	1	0	0
1	0	1	1	1
0	0	0	0	0
0	0	0	1	0
0	0	0	0	1
0	1	1	1	1
0	0	0	0	0
0	0	0	1	0



Logistic Regression: Assumes linear form



Vocabulary

$$x = \begin{bmatrix} 1 \\ 0 \\ 0 \\ \vdots \\ 1 \\ \vdots \\ 0 \end{bmatrix} \quad \begin{matrix} \text{a} \\ \text{aardvark} \\ \text{aardwolf} \\ \vdots \\ \text{buy} \\ \vdots \\ \text{zygmurgy} \end{matrix}$$