

Case ID	Attribute 1 Headache	Attribute 2 Spots	Attribute 3 Stiff-neck	Target/Class Diagnosis
1	Yes	Yes	Yes	Positive
2	No	Yes	No	Positive
3	Yes	No	Yes	Positive
4	No	Yes	Yes	Positive
5	Yes	Yes	Yes	Positive
6	No	No	Yes	Negative
7	No	Yes	No	Negative
8	No	Yes	No	Negative
9	Yes	No	No	Negative
10	No	No	No	Negative

Headache	Positive	Negative	Total
Yes	3 ( $4 * \frac{1}{2} = 2$ )	1 ( $4 * \frac{1}{2} = 2$ )	4
No	2 ( $6 * \frac{1}{2} = 3$ )	4 ( $6 * \frac{1}{2} = 3$ )	6
Total	5	5	10
Global Prob	1/2	1/2	1

$$X^2 = (((3 - 2)^2) / 2) + (((1-2)^2) / 2) + (((2-3)^2) / 3) + (((4-3)^2) / 3) = 1.6666$$

Spots	Positive	Negative	Total
Yes	4 ( $6 * \frac{1}{2} = 3$ )	2 ( $6 * \frac{1}{2} = 3$ )	6
No	1 ( $4 * \frac{1}{2} = 2$ )	3 ( $4 * \frac{1}{2} = 2$ )	4
Total	5	5	10
Global Prob	1/2	1/2	1

$$X^2 = (4-3)^2 / 3 + (2 - 3)^2 / 3 + (1 - 2)^2 / 2 + (3-2)^2 / 2 = 1.6666$$

Stiff-Neck	Positive	Negative	Total
Yes	4 ( $5 * \frac{1}{2} = 2.5$ )	1 ( $5 * \frac{1}{2} = 2.5$ )	5
No	1 ( $5 * \frac{1}{2} = 2.5$ )	4 ( $5 * \frac{1}{2} = 2.5$ )	5
Total	5	5	10
Global Prob	1/2	1/2	1

$$X^2 = (4 - 2.5)^2 / 2.5 + (1 - 2.5)^2 / 2.5 + (1 - 2.5)^2 / 2.5 + (4-2.5)^2 / 2.5 = 3.6$$

### Split on Stiff-Neck

#### YES

Headache	Positive	Negative	Total
Yes	3 ( $3 * 0.8 = 2.4$ )	0 ( $3 * 0.2 = 0.6$ )	3
No	1 ( $2 * 0.8 = 1.6$ )	1 ( $2 * 0.2 = 0.4$ )	2
Total	4	1	5
Global Prob	4/5 = 0.8	1/5 = 0.2	1

$$X^2 = (3 - 2.4)^2 / 2.4 + (0 - 0.6)^2 / 0.6 + (1 - 1.6)^2 / 1.6 + (1 - 0.4)^2 / 0.4 = 1.875$$

<u>Spots</u>	Positive	Negative	Total
Yes	3 (3 * 0.8 = 2.4)	0 (3 * 0.2 = 0.6)	3
No	1 (2 * 0.8 = 1.6)	1 (2 * 0.2 = 0.4)	2
Total	4	1	5
Global Prob	0.8	0.2	1

$$X^2 = (3 - 2.4)^2 / 2.4 + (0 - 0.6)^2 / 0.6 + (1 - 1.6)^2 / 1.6 + (1 - 0.4)^2 / 0.4 = 1.875$$

Value the same so either one. I will choose headache

No

<u>Headache</u>	Positive	Negative	Total
Yes	0 (1 * 0.2 = 0.2)	1 (1 * 0.8 = 0.8)	1
No	1 (4 * 0.2 = 0.8)	3 (4 * 0.8 = 3.2)	4
Total	1	4	5
Global Prob	0.2	0.8	1

$$X^2 = (0 - 0.2)^2 / 0.2 + (1 - 0.8)^2 / 0.8 + (1 - 0.8)^2 / 0.8 + (3 - 3.2)^2 / 3.2 = 0.3125$$

<u>Spots</u>	Positive	Negative	Total
Yes	1 (3 * 0.2 = 0.6)	2 (3 * 0.8 = 2.4)	3
No	0 (2 * 0.2 = 0.4)	2 (2 * 0.8 = 1.6)	2
Total	1	4	5
Global Prob	0.2	0.8	1

$$X^2 = (1 - 0.6)^2 / 0.6 + (2 - 2.4)^2 / 2.4 + (0 - 0.4)^2 / 0.4 + (2 - 1.6)^2 / 1.6 = 0.8333$$

Split on spots

