Machine Learning

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1 Ex1

To evaluate a new test for detecting Hansen's disease, a group of people 5% of which are known to have Hansen's disease are tested. The test finds Hansen's disease among 98% of those with the disease and 3% of those who don't. What is the probability that someone testing positive for Hansen's disease under this new test actually has it?

$P(disease) = 0.05$
P(not disease) = 1 - $P(disease) = 0.95$
$P(positive \mid disease) = 0.98$
$P(positive \mid notdisease) = 0.03$

$$P(disease \mid positive) = \frac{P(positive \mid disease) \times P(disease)}{P(positive)}$$

$$= \frac{P(positive \mid disease) \times P(disease)}{P(positive \mid disease) \times P(disease) + P(positive \mid notdisease) \times P(notdisease)}$$

$$= \frac{0.98 \times 0.05}{0.98 \times 0.05 + 0.03 \times 0.95}$$

$$= 0.63225$$