Machine Learning - Homework Week 1

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1 Exercise 1

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?

Solution

Let A be an event that someone testing positive for disease.
Let B be an event that someone tested with new test.

$$P(A|B) = \frac{P(AB)}{P(B)}$$

$$P(A|B) = \frac{(0.05.0.98)}{(0.05.0.98) + (0.95.0.03)}$$

$$P(A|B) = \frac{98}{155}$$

The probability that someone testing positive for Hansen's disease under this new test actually has it is nearly 63.2%.