① Boyes Theorem Formula and Proof:

A , B = events

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

P(B|A) = Conditional Probability of B given A (Likelihood)

P(A) = Prior Probability of A

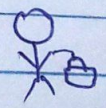
P(B) = Prior probability of B

P(A|B) = posterior probability

Proof:

$$P(A \cap B) = P(A|B)\ P(B)$$

P(A) P(B) P(A|B)



Shopping Rain

= 0.7 = 0.5 = 0.2

P (A ∩ B) = 0.2 * 0.5

= 0.10

$\Rightarrow \quad P(A \cap B) = P(B \cap A)$

(supposing intersection is commutative)

$\Rightarrow \quad P(A|B)\ P(B) = P(B|A)\ P(A)$

$\Rightarrow$ $$\boxed{P(A|B) = \frac{P(B|A)\ P(A)}{P(B)}}$$ Bayes Theorem