Bayes' Rule

Tuesday, January 19, 2021 8:43 AM

Announcement

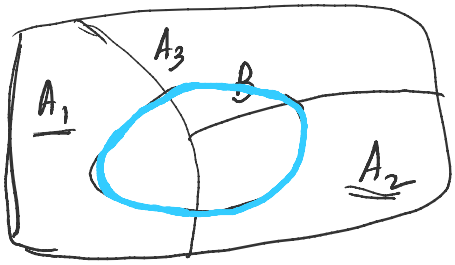
Quiz 1 on 25/1/21 (Monday) (30 min) at 5:30 pm

Bayes' Rule

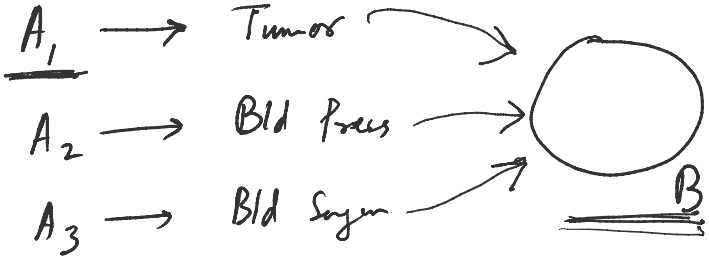
Let $A_1, A_2 \cdots A_n$ be a partition of Ω and $P(A_i) > 0 \ \forall i$. For any event B with $P(B) > 0$,

$$P(A_i|B) = \frac{P(A_i \cap B)}{P(B)} = \frac{P(A_i) \cdot P(B|A_i)}{\sum_{i=1}^{n} P(A_i) \cdot P(B|A_i)}$$

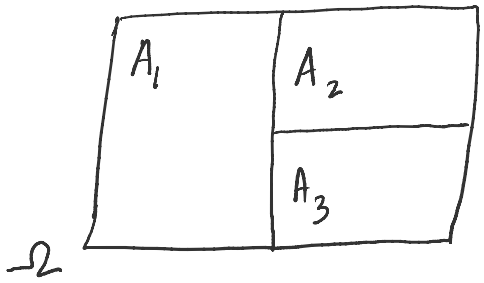
Given $P(B|A_i)$



$P(A_i|B)$



Ex



B = I win the game

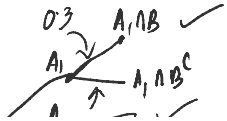
$P(B|A_1) = 0.3$

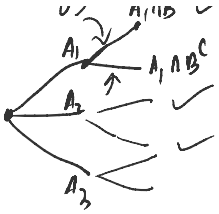
$P(B|A_2) = 0.4$

$P(B|A_3) = 0.5$

$P(B) = \sum P(A_i) \cdot P(B|A_i)$

$= 0.375$





$P(B|A_3) = 0.5$

$$P(A_2|B) = \frac{P(A_2) \cdot P(B|A_2)}{P(B)}$$