Conditional Probabilities

$$P(A \mid B) = \frac{P(A \cap B)}{P(B)}$$

P(A ∩ B) $= P(A|B)P(B)$

P(A ∩ B) $= P(B|A)P(A)$

Bayes and Naïve Bayes

$$=P(1st \& S)$$

$$P(S/1st) = \frac{P(1st|S)P(S)}{P(1st)}$$

$$= p(1s \& \sim s)$$

$$P(\sim S/1st) = \frac{P(1st|\sim S)P(\sim S)}{P(1st)}$$

See the excel file

Bayes and Naïve Bayes

$$P(S/1^{st} \& Female) = \frac{P(1st \& Female|S)P(S)}{P(1st \& Female)}$$

$$P(\sim S/1st \& Female) = \frac{P(1st \& Female/\sim S)P(\sim S)}{P(1st \& Female)}$$

See the excel file

Naïve Bayes

P(S/1st&Female)= $P(\mathbf{1}st\&Female|S)P(S) =$

Naive

$$P(\mathbf{1}st/S) * p(Female|S)P(S)$$

P(∼S/1s&Female)= $P\left(\dfrac{\mathbf{1}st\&Female}{\sim S}\right)P(\sim S) =$

Naive

$$P(\mathbf{1}st|\sim S) * P(Female/\sim S)P(\sim S)$$

Bayes and Naïve Bayes

Max of $P(\ominus 1|S) P(\ominus 2|S) P(S)$,   **Over all possible** S