

$\{ H=185, W=170, G=? \}$

## Numerical Data In Naive Bayes

| Height | Weight | Gender |
|--------|--------|--------|
| 172    | 150    | M      |
| 180    | 170    | M      |
| 165    | 140    | M      |
| 190    | 200    | M      |
| 139    | 100    | F      |
| 145    | 120    | F      |
| 160    | 140    | F      |
| 172    | 150    | F      |

$$P(M | H=185, W=170) = ? \quad | \quad P(F | \dots) = ?$$


$$= P(H=185 | M) P(W=170 | M) P(M)$$

From chart,  $P(M) = \frac{1}{2}$

now,  $P(H=185 | M) = ?$

→ There is no such data  $H=185$

in the input. So, how can we find the probability

Now, we will assume the height is a Gaussian distributed random variable / normal distribution 

Now, we will calculate,  $\mu, \sigma$  <sup>mean, standard dev</sup>

Now,  $f(x) = \frac{1}{\sigma \sqrt{2\pi}} e^{-\frac{1}{2} \left( \frac{x - \mu}{\sigma} \right)^2}$

it will be the  $P(H=185 \text{ (m)})$  where

$$x = 185$$

Then we will do the same as weight for male and female.

Then we can find the probability.

If it is not a normal distributed data we can plot and find the distribution then we can apply formula on it to find the probability.