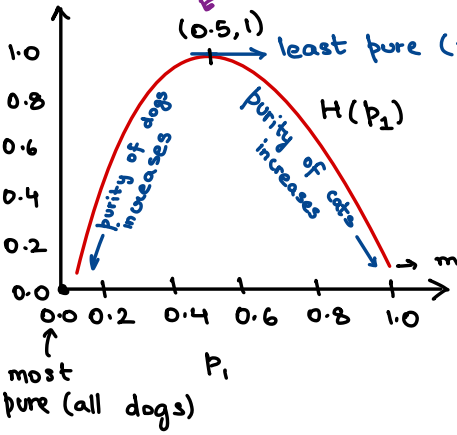
Entropy

Entropy is a function that takes in the input - for no. of examples of something and gives its impurity.

Let's take the example of cats.

p_1 = fraction of cats. Suppose $p_1 = \frac{3}{6} = 0.5$



$[p_1 = \frac{0}{6}]$

(0.5, 1) → least pure (= 1.0) → basically 50-50 = most impure

If $p_1 = \frac{5}{6} = 0.65$, $H(p_1) \approx 0.83$

→ most pure (all cats) $[p_1 = \frac{6}{6}]$

If $p_1 = \frac{2}{6} = 0.33$, $H(p_1) = 0.92$

more impure than $p_1 = \frac{5}{6}$, the closer it is to the middle i.e. 1, the more impure it is.

The entropy function 'H' is :-

$$H(p_1) = -p_1 \log_2(p_1) - p_0 \log_2(p_0)$$

$$= H(p_1) = -p_1 \log_2(p_1) - (1-p_1) \log_2(1-p_1)$$ [because $p_0 = 1 - p_1$]

↓ we take log base 2 to make peak of this curve reach 1 for simple calculations instead of base e

$0 \log 0$ is assumed as 0 even though $\log 0$ is undefined.