< Decision Tree - Continuous valued features >

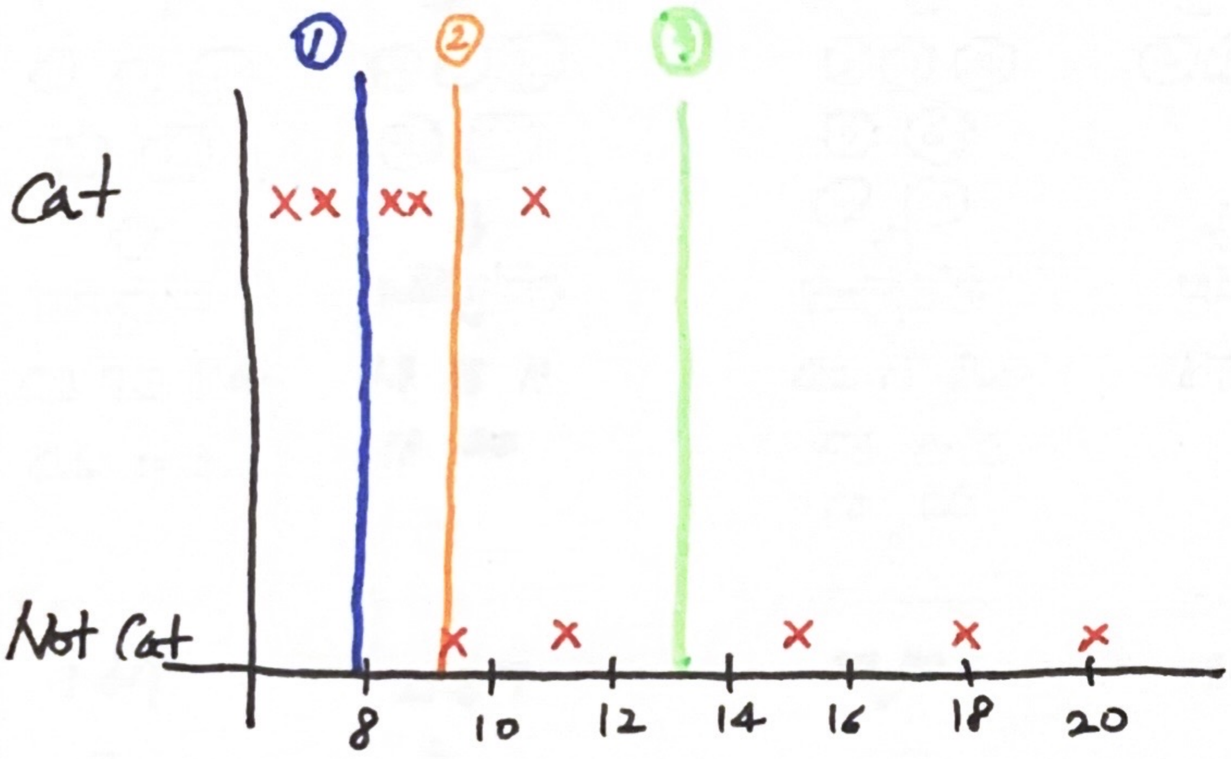
- not just discrete number but continuous value that is features can be any number

ex)

	Ear shape	Face shape	Whiskers	Weight (lbs) ← continuous value	Cat
①	Pointy	Round	Present	7.2	1
②	Floppy	Not round	Present	8.8	1
③	Floppy	Round	Absent	15	0
⋮	⋮	⋮	⋮	⋮	⋮

* Splitting on a continuous variable

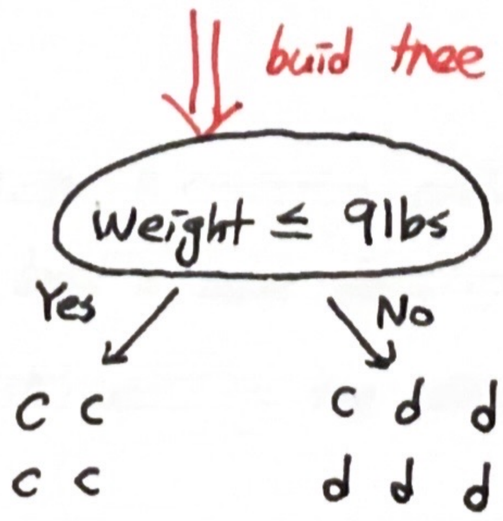
- the way to split on the weight feature : compute entropy (for picking the best information gain) based on whether or not the weight is less than or equal to some values (threshold)



① Weight ≤ 8lbs ⇒ $H(0.5) - \left(\frac{2}{10}H\left(\frac{2}{2}\right) + \frac{8}{10}H\left(\frac{3}{8}\right)\right) = 0.24$

② Weight ≤ 9lbs ⇒ $H(0.5) - \left(\frac{4}{10}H\left(\frac{4}{4}\right) + \frac{6}{10}H\left(\frac{1}{6}\right)\right) = 0.61$

③ Weight ≤ 13lbs ⇒ $H(0.5) - \left(\frac{11}{10}H\left(\frac{5}{11}\right) + \frac{3}{10}H\left(\frac{0}{3}\right)\right) = 0.40$



* Summarize *

decision tree with continuous value

① try different threshold

② do information gain calculation

③ split on the continuous value feature with with the selected threshold which gives the best information gain