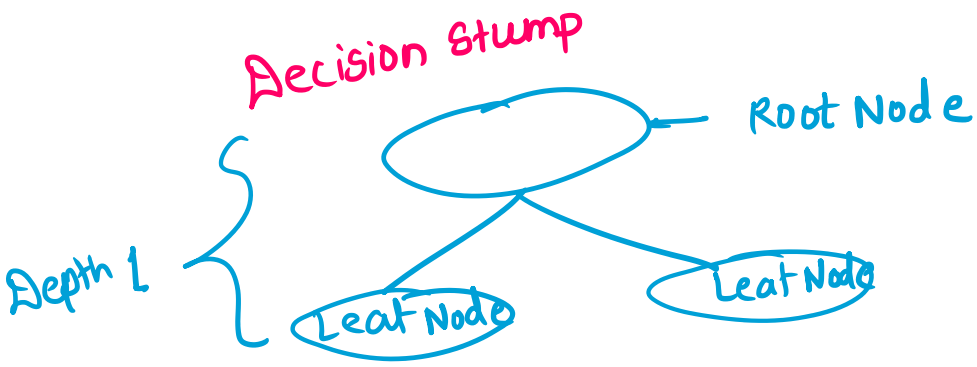
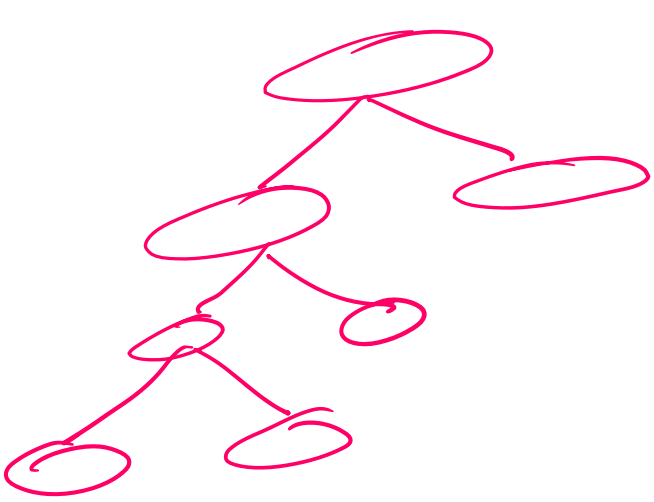
AdaBoost

24 May 2023 08:05 AM





features →

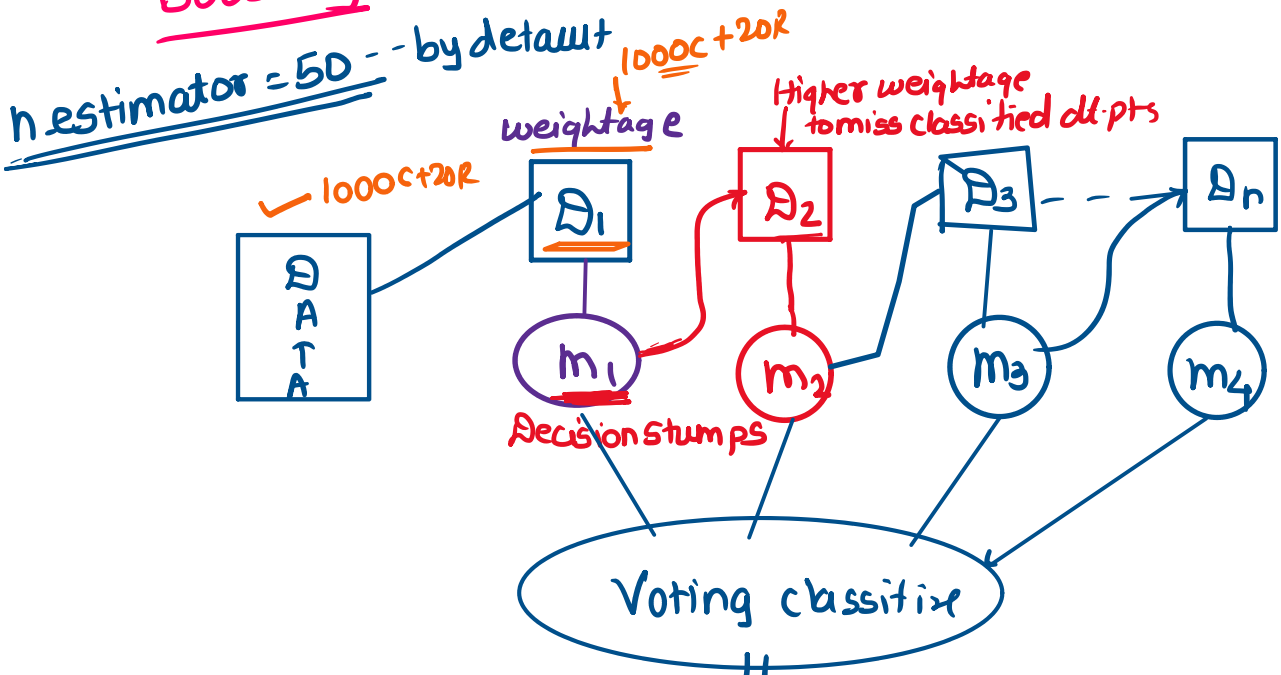
Decision tree: - All features

Random forest - 'sqrt'

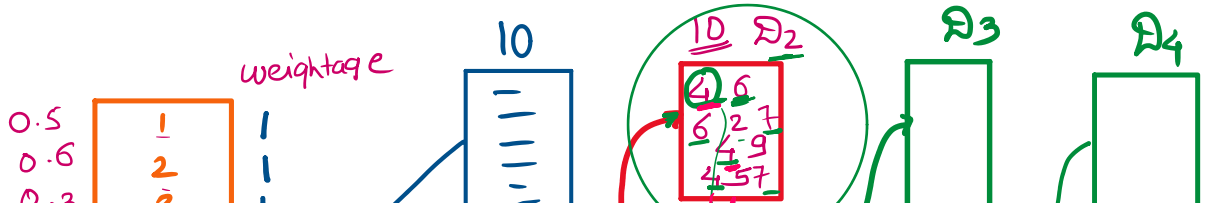
Adaptive Boost - Decision stump

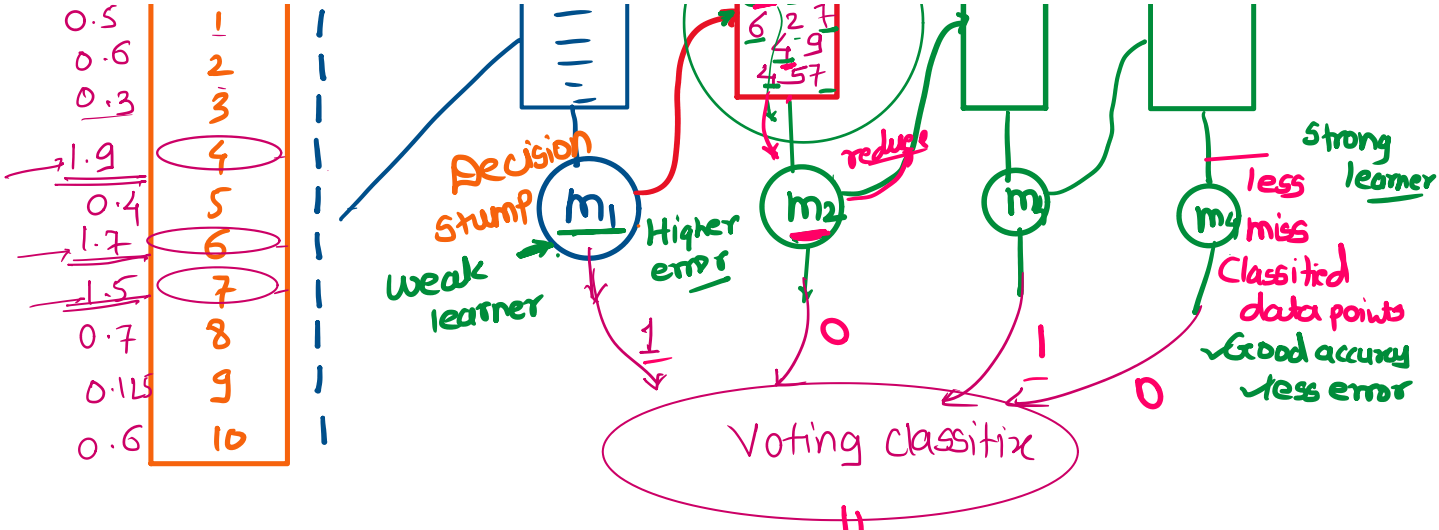
Boosting

n estimator = 50 - - by default



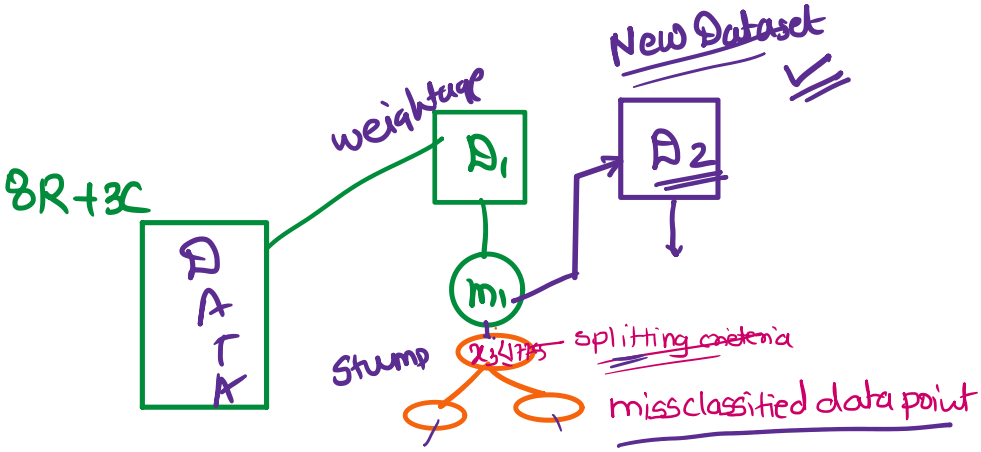
Prediction





Prediction

For equal no of (0th class) samples

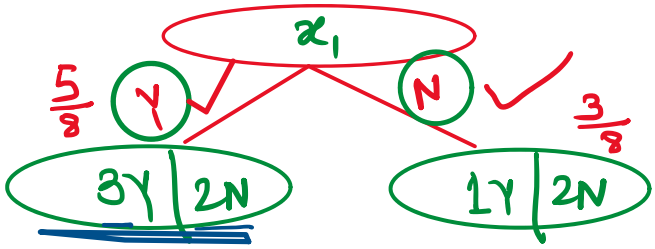


x_1, x_2, x_3 → ASM → GI → Bydefault

Entropy

$$GI = 1 - [P(Y)^2 + P(N)^2]$$

For x_1 → GI calculations (8)



$$GI(Y) = 1 - [P(Y)^2 + P(N)^2]$$

$$= 1 - \left[\left(\frac{3}{5}\right)^2 + \left(\frac{2}{5}\right)^2\right]$$

$= 0.48$

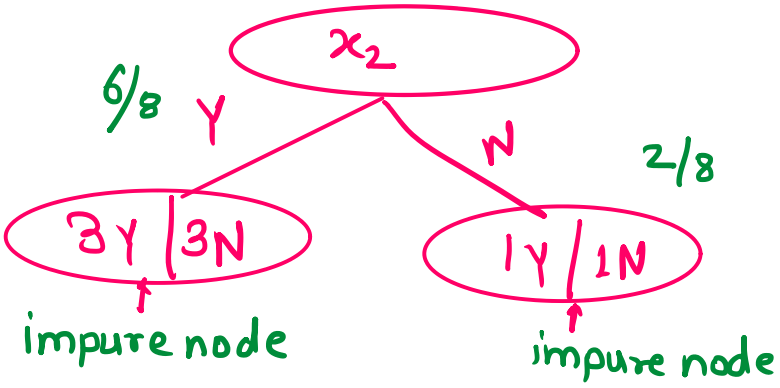
$GI(N) = 1 - [(1/3)^2 + (2/3)^2]$

$= 0.44$

Overall $GI(x_1) = \frac{5}{8} \times 0.48 + \frac{3}{8} \times 0.44$

$GI(x_1) = 0.4665$

calculation of GI for x_2.



$GI(Y) = 0.5$

$GI(N) = 0.5$

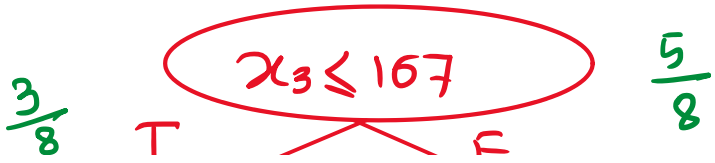
Overall $= \frac{6}{8} \times 0.5 + \frac{2}{8} \times 0.5$

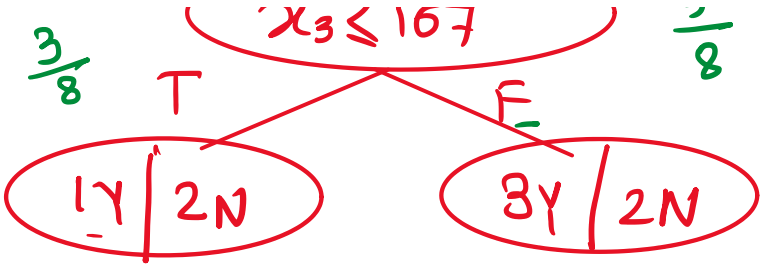
$= \frac{3}{8} + \frac{1}{8} = 0.5$

$GI(x_2) = 0.5$

GI calculations for x_3

Thresh $= x_3 \leq 167$





$GI(T) = 1 - \left[\left(\frac{1}{3}\right)^2 + \left(\frac{2}{3}\right)^2\right]$

$= 0.4444$

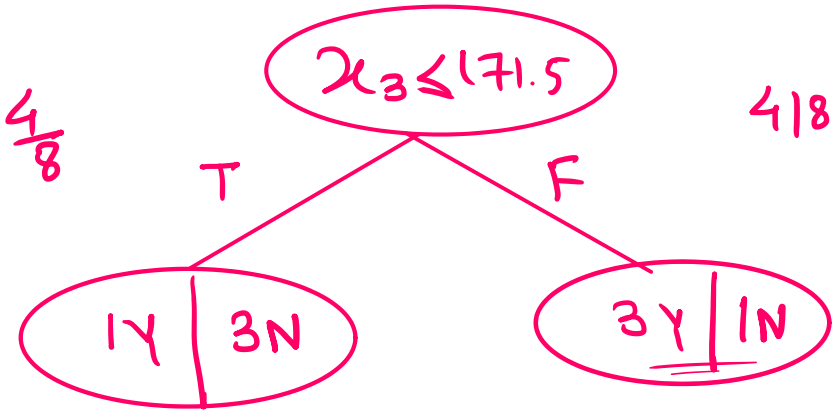
$GI(F) = 1 - \left[\left(\frac{3}{5}\right)^2 + \left(\frac{2}{5}\right)^2\right]$

$= 0.48$

Overall = 0.4665

$x \leq 167$

Thresh = 171.5



418

$GI(T) = 1 - \left[\left(\frac{1}{4}\right)^2 + \left(\frac{3}{4}\right)^2\right]$

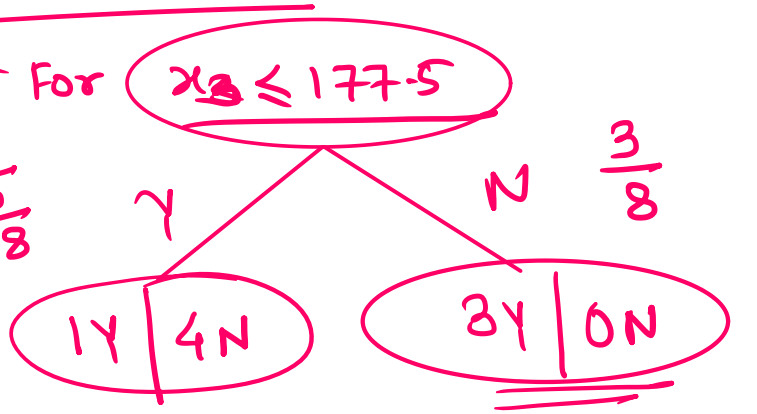
$= 0.375$

$GI(F) = 0.375$

Overall = $\frac{4}{8} \times 0.375 + \frac{4}{8} \times 0.375$

$x_3 \leq 171.5 = 0.375$

GI For $x_3 \leq 177.5$



GI = 0

$$GI(Y) = 1 - \left[\left(\frac{1}{5}\right)^2 + \left(\frac{4}{5}\right)^2\right]$$

$$= 0.3199$$

$$\text{Overall GII} = \frac{5}{8} \times 0.3199 + \frac{3}{8} \times 0$$

$$= 0.1999$$