

Assignment 2

Name: Mostroor Mofiz Arman

ID: 1921079642

Course: CSE445

Section: 04

Submitted to:

Intisar Tahmid Naheen (ITN)
Department of Electrical & Computer Engineering
North South University.

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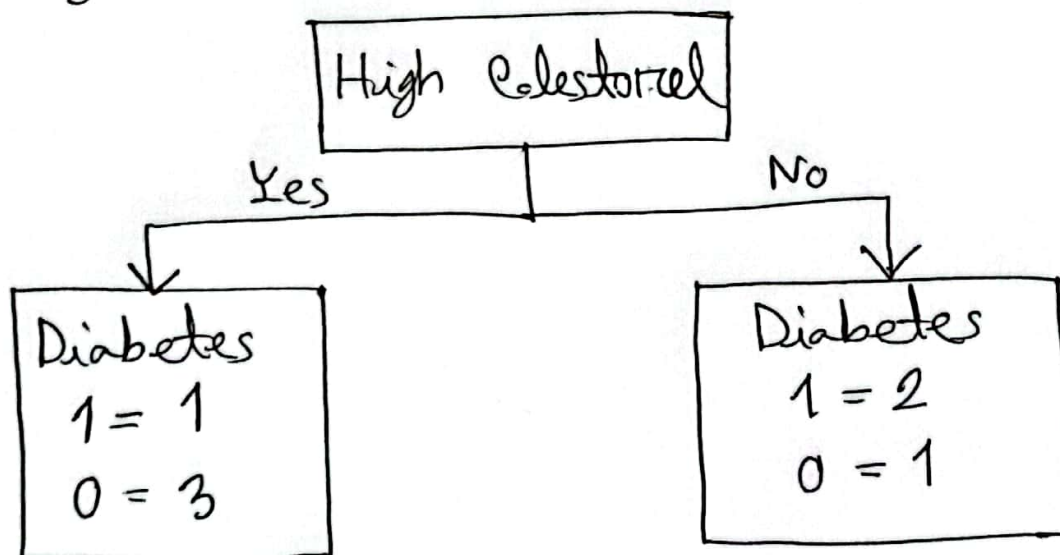
High Cholesterol	Regular Exercise	Age	Diabetes
Y	Y	7	0
Y	N	18	0
N	Y	12	1
N	Y	38	1
Y	Y	35	1
Y	N	50	0
N	N	83	0

We know,

$$J(K, t_k) = \frac{m_{\text{left}}}{m} G_{\text{left}} + \frac{m_{\text{right}}}{m} G_{\text{right}}$$

and Gini index: $G_i = 1 - \sum_{k=1}^n (P_{i,k})^2$

High Cholesterol:



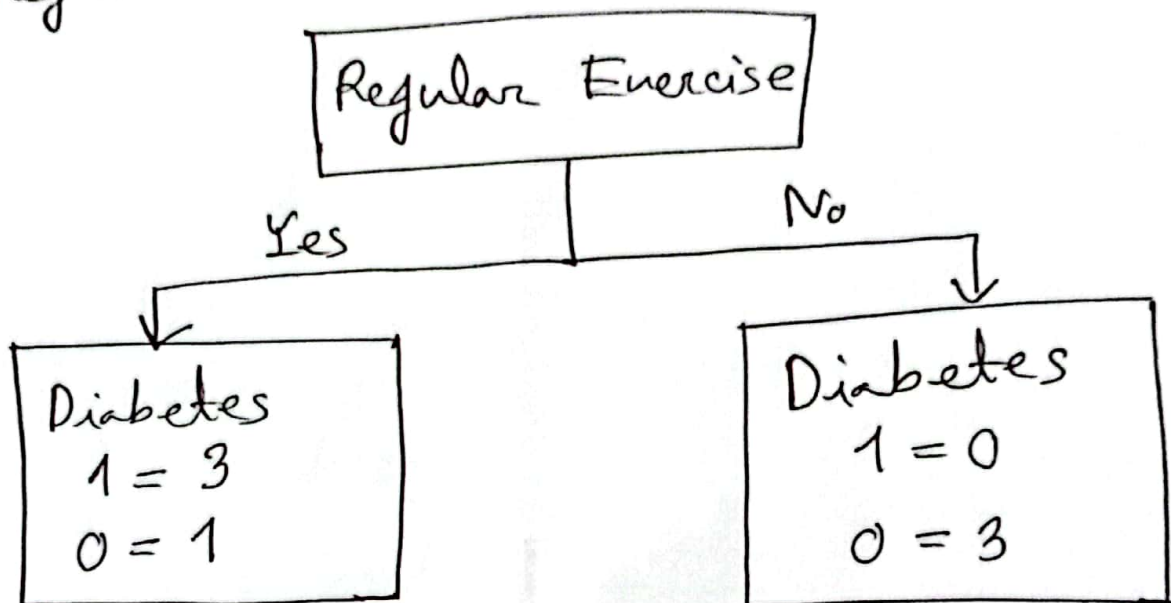
$$G_{\text{left}} = 1 - \left(\frac{1}{1+3}\right)^2 - \left(\frac{3}{1+3}\right)^2 = 0.375$$

$$G_{\text{right}} = 1 - \left(\frac{2}{2+1}\right)^2 - \left(\frac{1}{2+1}\right)^2 = 0.444$$

$$\therefore \text{Gini impurity} = \frac{4}{7} \cdot 0.375 + \frac{3}{7} \cdot 0.444$$

$$= 0.405$$

Regular Exercise :



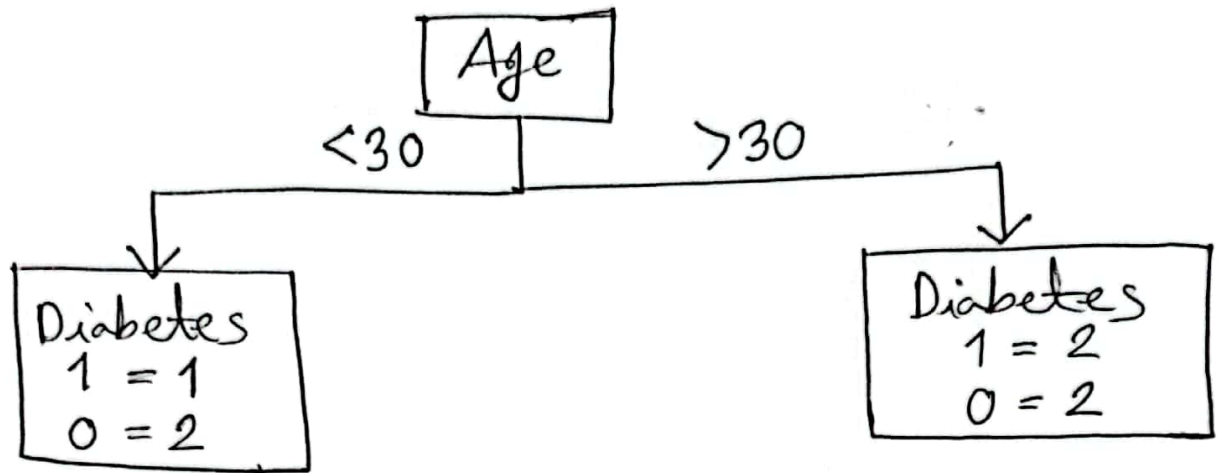
$$G_{\text{left}} = 1 - \left(\frac{3}{3+1}\right)^2 - \left(\frac{1}{3+1}\right)^2 = 0.375$$

$$G_{\text{right}} = 1 - \left(\frac{0}{0+3}\right)^2 - \left(\frac{3}{0+3}\right)^2 = 0$$

$$\therefore \text{Gini impurity} = \frac{4}{7} \cdot 0.375 + \frac{3}{7} \cdot 0$$

$$= 0.214$$

Age:



$$\text{Gini left} = 1 - \left(\frac{1}{1+2}\right)^2 - \left(\frac{2}{1+2}\right)^2 = 0.444$$

$$\text{Gini right} = 1 - \left(\frac{2}{2+2}\right)^2 - \left(\frac{2}{2+2}\right)^2 = 0.5$$

$$\begin{aligned}\therefore \text{Gini impurity} &= \frac{3}{7} \cdot 0.444 + \frac{4}{7} \cdot 0.5 \\ &= 0.476\end{aligned}$$