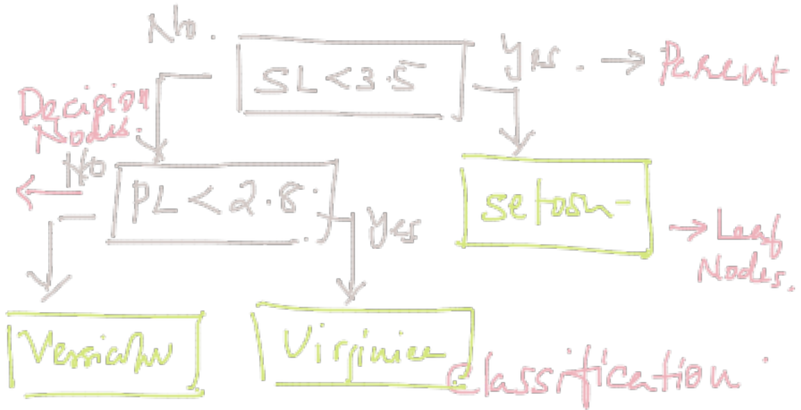
Decision Tree



Classification.

Decision Tree

— Rule Based algorithm.

— Interpretable

— classification ✓

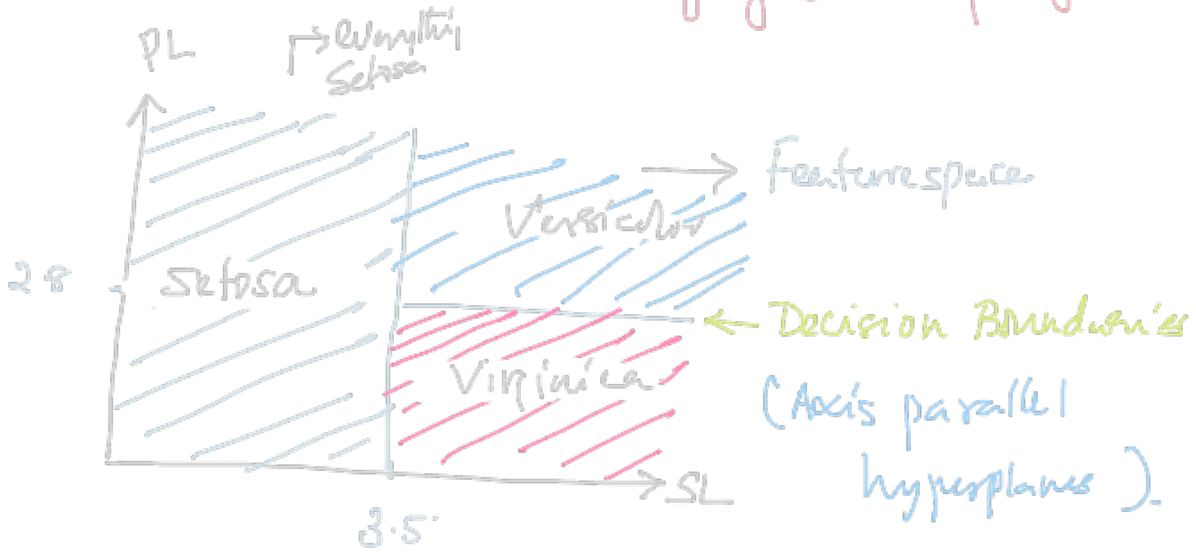
— Regression

Black Box.

→ Neural Nets.

→ financial transactions

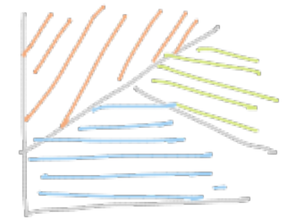
Partitioning the feature space into pure regions, each belonging to a specific class.



Dataset

SL	PL	species.
—	—	Versicolor
—	—	Virginica
—	—	Setosa.

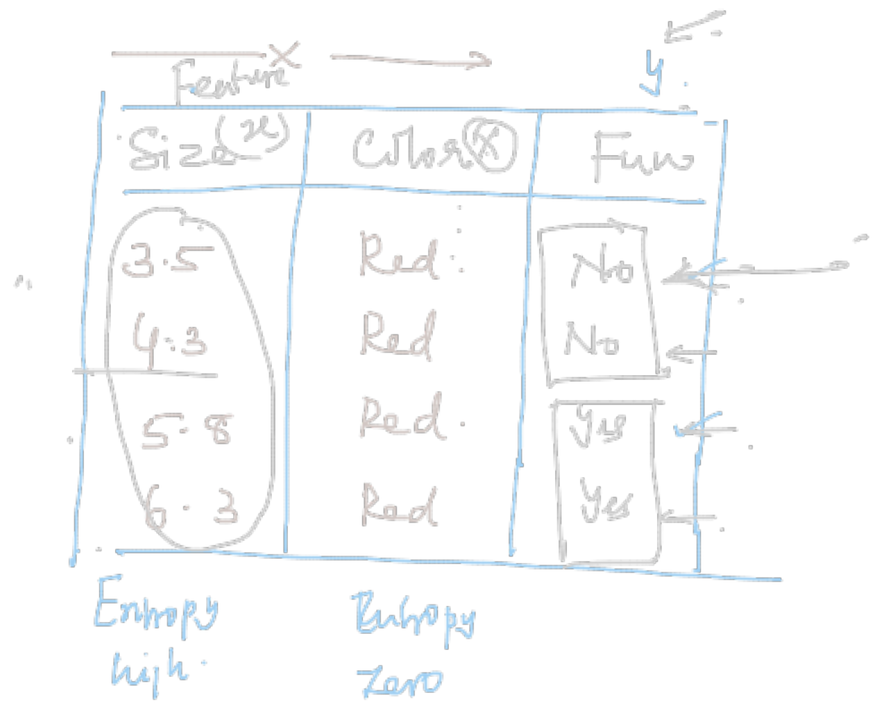
if SL < 3.5
    setosa.
else.
    PL < 2.8.
        Virginica.
    else
        Versicolor



Not Axis parallel.

Entropy & Information Gain

— Degree of uncertainity in the data.



$$\text{Entropy} = -\sum_{i=1}^{k} p_i \log(p_i)$$

k - No. of classes in 'y'

$$E = -\left[P_{yes}\log(P_{yes}) + P_{No}\log(P_{No})\right]$$

(-0.6) (-0

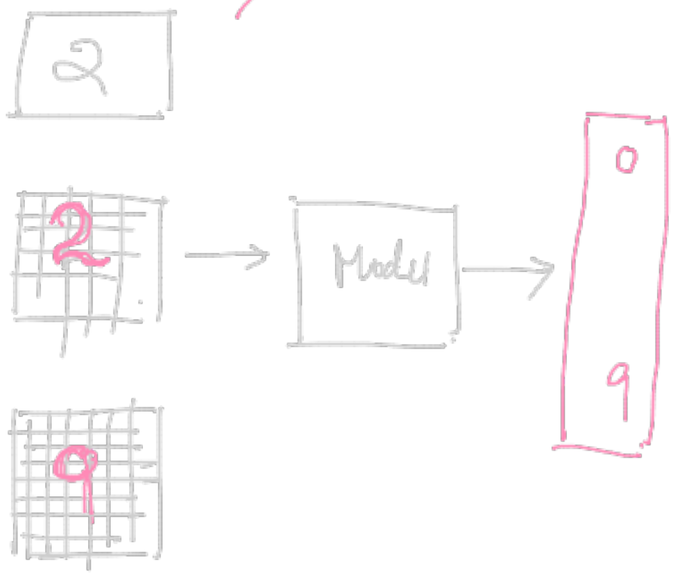
Information Gain (IG) = Entropy of Parent − Weighted Entropy of child groups.

$$= 0.94 - \left[\tfrac{5}{14} \times 0.97 + \tfrac{4}{14} \times 0 + \tfrac{5}{14} \times 0.97\right]$$

$$= 0.94 - 0.69$$

$$IG = 0.25$$

7 7



273

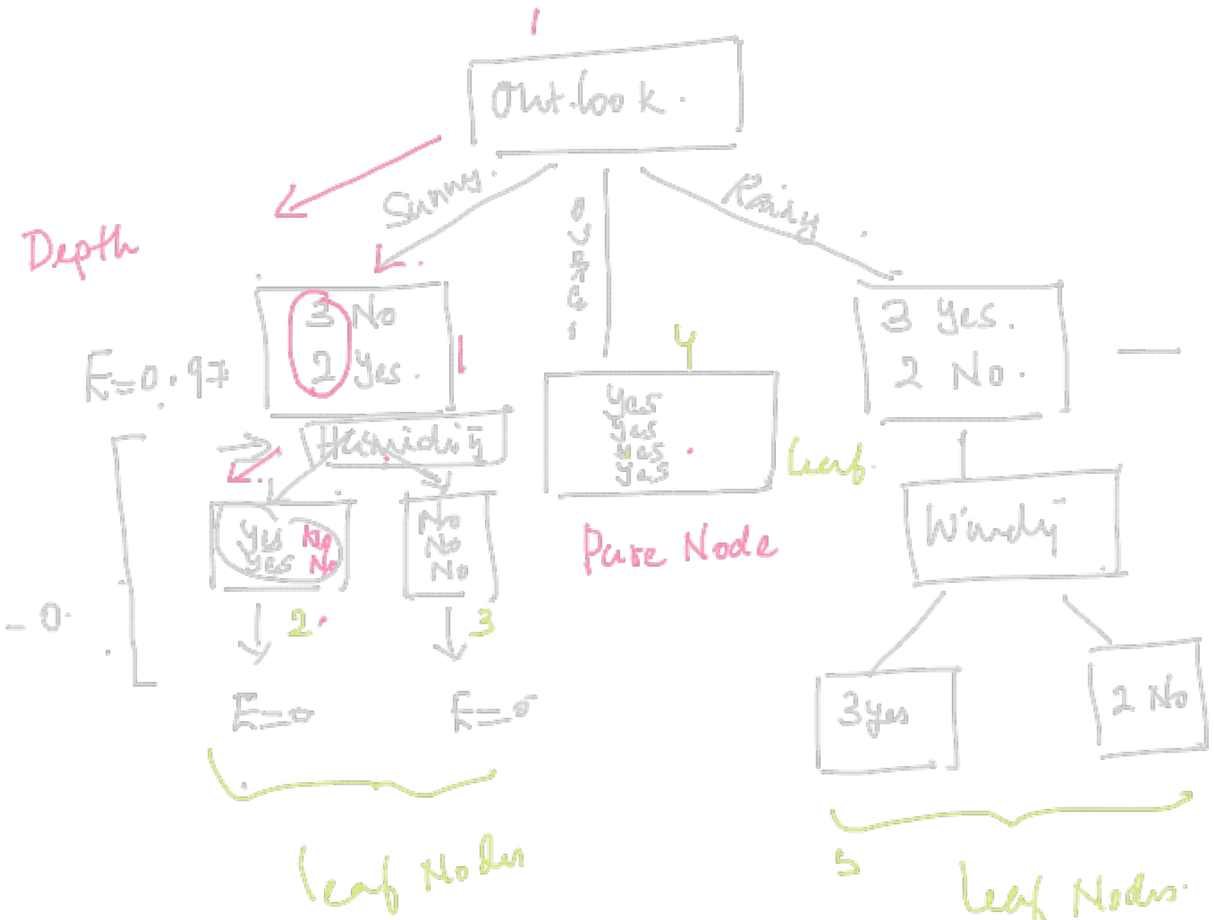
Outlook Temp Humidity Windy

Overfitting ←

10·45 am

Pure

Depth

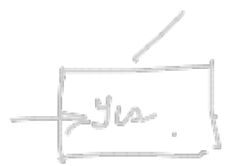


IG. 0.97 - 0.

Ia →

Maximum (IG.)

Minimum (Impurity



Classification Model

Minimum Impurity →

Maximum In,

$$I_G = 1 - \sum_{i=1}^{k} (P_i)^2$$

minimize.

Child Impurity

IG → Information Gain.

→ (Maximize)