

$$\int^2 \alpha_1(\text{model}_1) p \alpha_2(\text{model}_2) \alpha_3(\text{model}_3) +$$

$$\alpha_n(\text{model}_n)$$

Step 1: ~~Creating Decision Tree + splits~~
Step 2: ~~Initial sample weight.~~

Step 3: calculating total error & performance.

TE \rightarrow sum of weights

$$\text{Performance} = \frac{1}{2} \log \left(\frac{1 - \text{total error}}{\text{total error}} \right)$$

$$\alpha_i = \frac{1}{2} \ln \left(\frac{1 - \text{total error}}{\text{total error}} \right)$$

Step 4: Updating weights for the next model.

(Classification correct)

$$\text{New weight} = \text{weight} \times e^{-\alpha}$$

(Incorrect classification)

$$\text{New weight} = \text{weight} \times e^{\alpha}$$

Step 5: Normalization and Data Selection

$$\text{normalize correct} = \frac{\text{update weight (correct)}}{\text{sum.}}$$

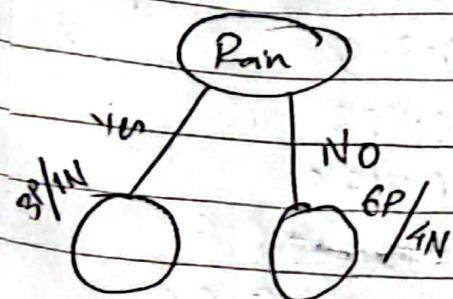
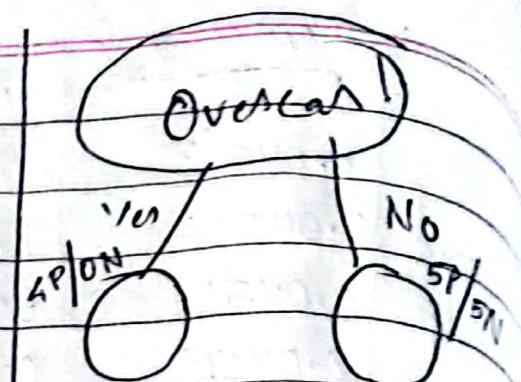
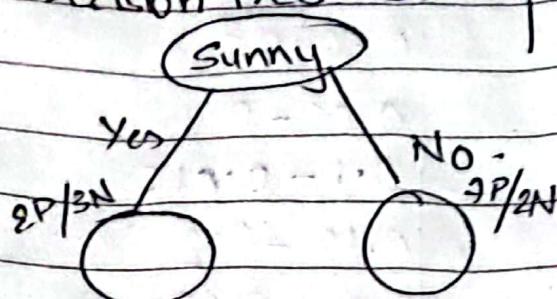
$$\text{normalize incorrect} = \frac{\text{update weight (incorrect)}}{\text{sum.}}$$

bin = ?

Find step.

randomly bin choose and send to.
model.

Step 1: Decision tree - Strung



Step 2: Initial sample weight $\Rightarrow 1/14$.

Step 3: calculate total error & performance.

$$TE \rightarrow \text{sum of weights: } 1/14 + 1/14 + 1/14 + 1/14 = 4/14$$

Performance =

$$\alpha_1 = \frac{1}{2} \ln \left(\frac{1-2/7}{2/7} \right) \Rightarrow 0.4581$$

Step 4: Updating weight for next model.

Classification correct

$$\begin{aligned} \text{New weight} &= \text{weight} \times e^{-\alpha} \\ &= \frac{1}{14} \times e^{-0.4581} \end{aligned}$$

$$\approx 0.04517$$

$$\begin{aligned} \text{New weight} &= \text{weight} \times e^{\alpha} \\ &= \frac{1}{14} \times e^{0.4581} \end{aligned}$$

$$= 0.1129$$

$$\text{Sum} = 10 \times 0.04512 + 4 \times 0.1129$$
$$= 0.9033$$

correct $\rightarrow 10$
incorrect = 4

$$\text{Normalize correct} = \frac{0.04512}{0.9033} = 0.050$$

$$\text{Incorrect} = \frac{0.1129}{0.9033} = 0.1249$$

Step 1: creating Decision Tree "stumps"

Entropy, Gini Impurity or Information Gain

	Outlook	Outlook	Temperature	Humidity	Windy	Class	sup.
1	✓ sunny		hot	high	false	N	1/14
2	✓ sunny		hot	high	true	N	1/14
3	✓ overcast		hot	high	false	P.	1/14
4	✓ rain		mild	high	false	P.	1/14
5	✓ rain.		cool	normal	false	P.	1/14
6	X rain		cool	normal	true	V.	1/14
7	✓ overcast		cool	normal	false, true	P.	1/14
8	✓ sunny		mild	high	false	N	1/14
9	X sunny		cool	normal	false	P	1/14
10	✓ rain.		mild	normal	false	P	1/14
11	X sunny		mild	normal	true	P	1/14
12	✓ overcast		mild	high	true	P	1/14
13	✓ overcast		hot	normal	false	P	1/14
14	X rain		mild	high	true	N	1/14

$$\text{Normalize correct} = \frac{0.04517}{0.9032} = 0.050$$

$$\text{Incorrect} = \frac{0.1129}{0.9032} = 0.1249$$

SW.	Updated weight Normalized	Normalize.	Bin.
✓ 1/14	0.04517	0.05	0 - 0.05.
✓ 1/14	0.04517	0.05	0.05 - 0.1
✓ 1/14	0.04517	0.05	0.1 - 0.15
✓ 1/14	0.04517	0.05	0.15 - 0.2
✓ 1/14	0.04517	0.05	0.2 - 0.25
✗ 1/14	0.1129	0.125	0.25 - 0.375
✓ 1/14	0.04517	0.05	0.375 - 0.425
✗ 1/14	0.04517	0.05	0.425 - 0.475
✗ 1/14	0.1129	0.125	0.475 - 0.599 0.6
✓ 1/14	0.04517	0.05	0.699 - 0.6 - 0.65
✗ 1/14	0.1129	0.125	0.65 - 0.775
✓ 1/14	0.04517	0.05	0.775 - 0.825
✓ 1/14	0.04517	0.05	0.825 - 0.875
✗ 1/14	0.1129	0.125	0.875 - 1

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