

Information Gain

$$\text{entropy (flat)} = 0$$

$$P_{\text{slow}} = \frac{2}{3} \quad P_{\text{fast}} = \frac{1}{3}$$

$$\text{information gain} = \text{entropy (parent)} - \left[\text{weighted average} \right] \text{entropy (children)}$$

grade	bumpiness	speed limit	speed
steep	bumpy	yes	slow
steep	smooth	yes	slow
flat	bumpy	no	fast
steep	smooth	no	fast

$$\text{entropy of parent} = 1.0$$

$$\text{entropy} = \sum_i -P_i \log_2 P_i$$

$$\text{entropy} = \left[-\frac{2}{3} \log_2 \left(\frac{2}{3} \right) - \frac{1}{3} \log_2 \left(\frac{1}{3} \right) \right]$$

$$= 0.9182958340544896$$