

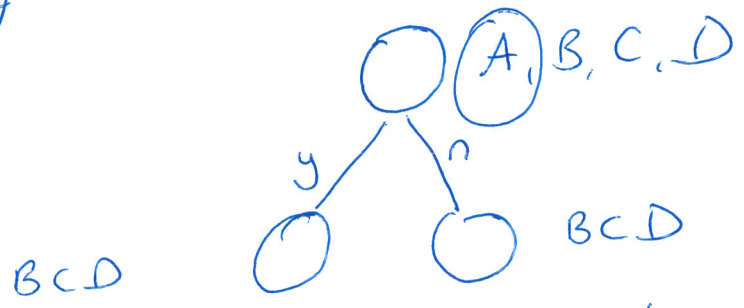
Feb 13, 2017

Monday

given data

features	A	B	C	D	classification
examples 1	yes	no	blue	true	G E
2	yes	no	red	true	B F
3					
4					

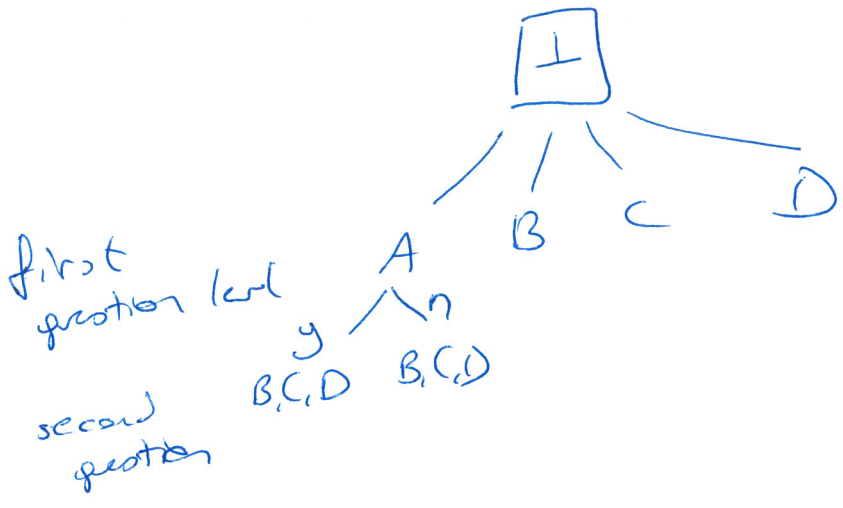
pick the best question



searching for

the minimal decision tree
↓
classifies in as few questions as possible.

order ABCD all possible orderings.



first question level
second question

2 possible answers for the attribute

attribute

(2)

cap color	red	beige
	20	20
	10	10
	P	P
	✓	✓

50%

spotted	yes	no
	19	20
	1	11
	P	P
	✓	✓

95% of dying

funnel cap	yes	no
	20	0
	0	20
	P	P
	✓	✓

If you had one question to ask:
which one would it be

we want to classify mushroom
poisonous or not poisonous

the question would be funnel cap.

now: funnel cap is not an option

probability of making a wrong classification

(3)

$$\frac{19}{20}$$

ask the question
spotted?

get the answer

yes

output the
majority

probability

no

not prisoners

probability of error

$p(\text{yes})$

$p(\text{no})$

$$\frac{20}{40}$$

$$\frac{1}{20}$$

+

$$\frac{20}{40}$$

$$\frac{9}{20}$$

	yes	no	
19	1	9	11
P	✓	P	✓

40

$$\frac{1}{40} + \frac{9}{40} = \frac{10}{40} \quad 25\%$$