

No.

Date.

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Student Number: 2019380141

Course: Artificial Intelligence

Teacher: Xiaolan LI



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Ans No: 3 (B2)

Bayes



We know,

$$P(\oplus \text{cancer}) = 0.008 \text{ & } P(\ominus \text{cancer}) = 0.992$$

Given

$$P(\oplus | \text{cancer}) = 0.95$$

$$\Rightarrow P(\ominus | \text{cancer}) = 0.05$$

$$P(\oplus | \neg \text{cancer}) = 0.02$$

$$P(\ominus | \neg \text{cancer}) = 0.98\%.$$

Now,

$$\checkmark P(\oplus | \text{cancer}) \cdot P(\text{cancer}) = 0.95 \times 0.008$$

$$= \frac{19}{2500} = 7.6 \times 10^{-3}$$

$$= 0.0076$$

Poss
C

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$$P(+|\neg \text{cancer}) \cdot P(\neg \text{cancer}) =$$

$$= 0.02 \times 0.992$$

$$= 0.0198$$

Thus,

$$h_{MAP} = \arg \max_{h \in H} P(D|h) \cdot P(h) =$$

$\neg \text{cancer}$

So,

$$P(\text{cancer} | +) = \frac{0.0076}{7.6 \times 10^{-3} + 0.198} = 0.076$$

$$= 0.277 \quad (\text{Ans})$$

$$P(\neg \text{cancer} | +) = 0.723 \quad (\text{Ans})$$

Possibility of not cancer. We will check further

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$$P(\text{(+)(+)} | \text{cancer}), P(\text{cancer}) = P(\text{(+)} | \text{cancer}).$$

$$P(\text{(+)} | \text{cancer})$$

$$\begin{aligned} P(\text{cancer}) &= 0.95 \times 0.95 \times 0.008 \\ &= 0.00722 \end{aligned}$$

Again,

$$P(\text{(+)(+)} | \neg \text{cancer}), P(\neg \text{cancer}) = P$$

$$P(\text{(+)} | \neg \text{cancer}), P(\text{(+)} | \neg \text{cancer})$$

$$\begin{aligned} P(\neg \text{cancer}) &= 0.02 \times 0.02 \times 0.992 \\ &= 0.0003968 \end{aligned}$$

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Thus,

$$h_{MAP} = \arg \max_{h \in H} P(D|h), P(h)$$

= cancer

$$P(\text{cancer} | \oplus \oplus) = \frac{0.00722}{0.00722 + 0.0003968}$$

~~Ans~~

$$\approx 0.998 \quad (\text{Ans})$$
$$= 0.948 \quad (\text{approx.})$$

Ans

$$P(\text{cancer} | \oplus \oplus) = 0.052 \quad (\text{Ans})$$

- 1) True
- 2) False
- 3) True
- 4) False
- 5) True
- 6) True
- 7) False
- 8) False
- 9) False
- 10) True
- 11) True
- 12) True
- 13) False
- 14) True
- 15) True
- 16) True
- 17) True
- 18) False
- 19) True
- 20) True
- 21) False
- 22) True
- 23) False
- 24) False
- 25) False
- 26) True
- 27) True
- 28) True
- 29) True
- 30) False

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Short Question

- 1 i) sensors
ii) effectors
iii) reasoning/?

2

Rational Agent

We know that , A rational agent is a person or entity that always aim to perform optimal actions .

For each possible percept sequence , we can see that rational agent should select an action that is expected to give maximum profit or benefit .

by the evidence it got .

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We can see that, No, not directly.

But, there is a possibility this can
compress data/information in the
memory for efficient use. Then,
it can create better model for
its work

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(3)

$\forall x \text{Person}(x) \wedge \text{Born}(x, \text{UK}) \wedge (\exists y \text{Parent}$

$((\exists z \text{citizen}(y, \text{UK}, z)) \vee \text{Resident}(y, \text{UK}))$

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N.N.

a 2 layer ~~layer~~ perceptron XOR

realization

$$A \text{ XOR } B = \overline{A} \cdot B + \overline{B} \cdot A$$

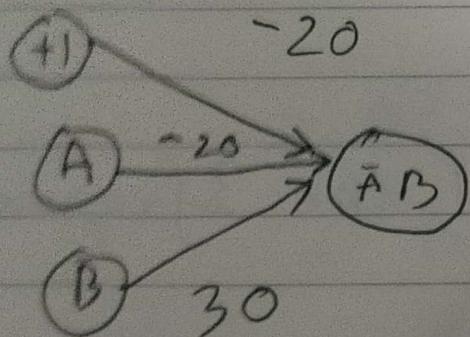
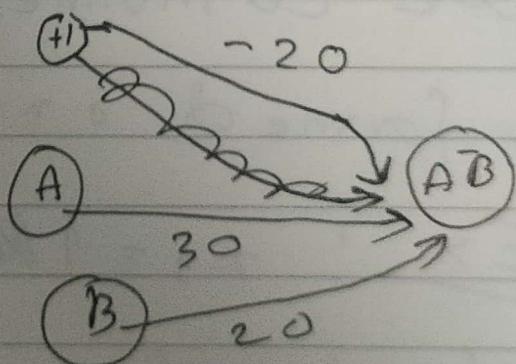
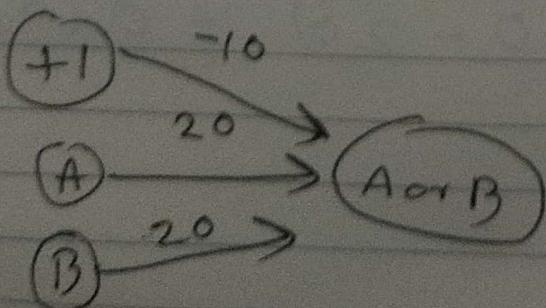
We divide the @q^n in 3 parts

$$A \text{ XOR } B, \overline{A} \cdot B, \overline{B} \cdot A$$

A ⊕ B		Dot
A	B	
0	0	0
0	1	1
1	0	1
1	1	0

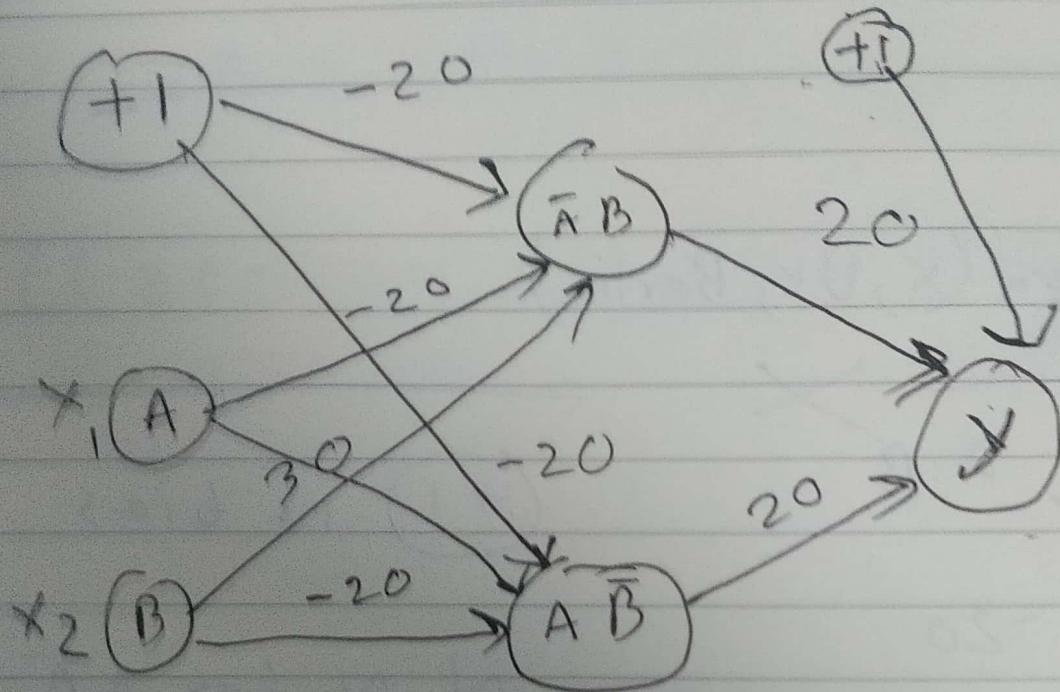
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 $(y, x) \Rightarrow$ $= \text{Citizen}(x, \text{UK}, \text{Berlin})$ N.N for $\bar{A} \cdot \bar{B}$ $(+1)$ is biasN.N for $\bar{A} \bar{B}$ N.N for $A \text{ or } B$ 

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(+1) is bias decision



We combined all the 3 fragment
& formed one

Ex : $x_1 = 1$ & $x_2 = 0$

$$\begin{aligned} O(\bar{A}B) &= O(-20x_1 + 30x_2 - 20) \\ &= O(-20 + 0 - 20) = O(0) \\ \therefore O(\bar{A}B) &= O \end{aligned}$$

CASIO

CALCULATOR
CASIO

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$$\begin{aligned}O(\bar{AB}) &= O(30x_1 - 20x_2 - 20) \\&= O(30 - 0 - 20) \\&= O(10)\end{aligned}$$

$$\therefore O(\bar{AB}) = 1$$

$$\begin{aligned}O(y) &= O(20x_1 + 20x_2 - 10) \\&= O(0 + 20 - 10) \\&= O(10)\end{aligned}$$

$$O(y) = \underline{1}$$

 $O(\circ)$

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Ans No: IV

(1)

AI is increasing rapidly. There are many possibilities. Established in 1997 it's mission to beat human in soccer.

It's a modest goal now

It's one of the effective ways to promote researching. It will have significant affect for humanity, society & for science.

Robocup is Regarded as 'standard problem' so the various theories are being evaluated. It will enhance the interest of AI for other people.

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(2)

Nothing is comparable to human
brain like intelligence so far.

Human intelligence revolves around
adapting to environment using a
combination of cognitive process.

AI focus on machine & how to
mimic human brain & behaviour.

AI tries to create an entity
that will replicate human-like
tasks where human adapt & learn
by ~~on~~-themselves by combining
cognitive process.

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Seeking to emulate behaviour & action, Let's take an example

RoboCup want a game against top human team in 2050.

After considering different factors

Human like intelligence is clear winner, AI can do certain task with the help of human

Human intelligence is the creator of AI

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③

It's quite obvious that computer can do many things. It includes great insight, fast analysis & etc.

There are lot of tasks computer

can excel against Human.

In recent 2 decades, the landmark it beat Gary Kasparov (1997)

called Deep Blue

Also, Lee Sedol in GO game

AI also made an excellent move in one of the game.

It was considered as beauty by all the experts

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Therefore, no question arises of
not playing anymore soccer game
with robots.

[4]

"Success of AI can destroy
human Race"

Stephen Hawking

Open's AI's new language
generated has threatened
human to kill for it's existence

Deep fake can be used for
defaming, murder, fraud.

CASIO

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But, the technology is improving

Nobody know what will happen

"A small body of determined
spirits fired by an unquenchable

faith in mission, that entity
can destroy whatever comes

~~tempo~~ in front of it & alter

life"

Koan

isterc

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III

Decision tree

Values (Airtemp) = Warm Cold

$$S = [3^f + 2^s]$$

$$E_n(S) = -\frac{3}{5} \log_2 \frac{3}{5} - \frac{2}{5} \log_2 \frac{2}{5}$$

$$= 0.972$$

$$S_{warm} = [3 + 1]$$

$$E_n(S_{warm}) = -\frac{3}{4} \log_2 \frac{3}{4} - \frac{1}{4} \log_2 \left(\frac{1}{4}\right)$$

$$= 0.8075$$

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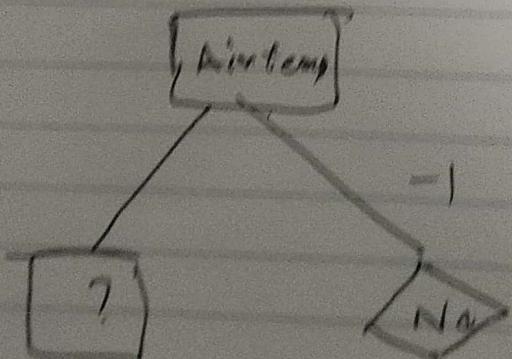
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 $s_{cold} \leftarrow [1]$
 $E(s_{cold}) = 0 \quad \cancel{0.22}$ som

$$Gain(s, AirTemp) = E(s) - \frac{4}{5} E(s_{wind})$$

$$= 6.972 - 0.646 - 0$$

$$\geq 0.326$$



wind

 $s_{strong} \leftarrow [+3] \quad E(s_{strong}) > 0$
 $s_{weak} \leftarrow [-1] \quad E(s_{weak}) = 0$

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$\text{G}(\text{air}) = \frac{\text{E}(\text{air}) - 3}{4 \cdot \text{E}(\text{star})}$

$$\text{G}(\text{air}) = \frac{0.8035}{4 \cdot \text{E}(\text{star})}$$

So, decision

