| | Ass | ignment 1 | 40:02 Op | age: | |
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| | Name: Pratile | S. Utel | <97 · | | |
| | Roll No: 73 | | | | |
| | class: BEI I | T | | | |
| | Sem: 7 | | | | |
| • | Sub: ISLAB | | | | |
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| | · Section | | | | |
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| 0.1 | Solve the following with forward chaining or |
|---------------|--|
| | backward chaining or resolution (any one) use |
| "mano") | predicate logic as language of knowledge repre- |
| | sentation clearly specify the facts & inference |
| | rule used A bold Timber (1) bell vice |
| | Eilen beliefer ver ind et for 80 meet 1 18 de la |
| Q·1] | Example 1: d. 1) and cally of more 1 years |
| | Every child sees some witch No witch has both |
| | a blank cat & a pointed hat. |
| 2] | Every witch is good or bad. |
| 3 | Every child who sees any good witch gets andy. |
| 4 | Every witch that is had has a black cat. |
| 5] | Every witch that is seen by any child has a |
| | pointed hat |
| | Prove: Every child gets candy. |
| | |
| \rightarrow | A) facts into fol |
| | i) 7 x AY (child: (x), witch (y) -> Sees (x, x)) |
| O Mari | m 7 Y (witch (Y) -> has (Y, black cat) 1 has |
| | (Y. pointed hat) |
| | 2) Fr (witch (Y) -> good (y) V bad (y)). |
| | 3) Fx ((Sees (x, r) -> (witch (y) -> good (y,)) -> |
| (| get (x, (andy) |
| | 47 EY ((witch (y) -> bad (y)) -> has (y -> black hat)) 5> EY (sees (x,y) -> has (Y, pointed hat) |
| | 5> EY (gees (x,y) -> has (Y, pointed hat) |
| | |
| | B) FOL into CNF. |
| | i) I xAx (child (x), witch (y) -> Sees (x, Y)) |
| | -> v = y, (witch (y) -> has (r, black hat) |
| | |
| | -> vn 7x (witch (y) -> has (r, pointed, hat). |

| . 1 | 2) 4y (witch (y) -> good (y)) |
|-----|--|
| , | Yr (witch (y) → bad (y)) |
| | 3) Fx [(sees (x, r) -> witch (y) -> good (y)) -> gets(x, andy) |
| | => Ex [(Sees (x, good (y) -> gets (x, candy)) |
| | 4> Ex [bad (4) -> has (Y, black hats)] |
| | 5> Ex [seen (x, y) -> has (x, pointed hat)] |
| | > n yr [seen (x, y) -> has (r, plack hat)] |
| | part does a residence somber eran blide process |
| | c> "a! == 1 grin. = 1, han distil ! |
| | Sees (X,Y) witch (Y) V Sees (X,Y) |
| | tgood V badly 3 |
| 7 | the delite a serie of the state and the |
| į. | Msein [xi (good) A sees (x, bad) has (Y1Z) |
| | FY. (good V bad 3 |
| | £ Z/ black cqt V |
| | pointed hat) } |
| | Seen (X, good) V Seen (X, bad) |
| | has (good, pointed |
| | hats V get [x, candy] |
| | |
| | Seen (x, good) V has (good, |
| | pointed hat) V gets Seen (x, good) V |
| | (x, candy) gets (x, candy) |
| | lossed in the Control of the Control |
| | Marine Marine Marine Sept Miles |
| | |
| | gets (x, candy) gets (x, candy) |
| | 100 - Elight Condation is resident with the |
| | - 1 1 1 dd 1 1) and a fall discoll vi or 1 - |
| | The state of the s |

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| 2 | Example 2! |
| | il Every boy or girl is a child |
| | 2] Every child gets 9 doll or 9 train or 9 lump |
| | of coaling |
| | 3 No boy gets any doll. |
| | 4] Every child who is bad gets any lymp of |
| | Coq! |
| 227 | 5) No child gets a train |
| • | France: Ram is bad. |
| | 7) Prove: Ram is bad. |
| | |
| \rightarrow | 1) 4 x (boy (x) or girl (x) > child (x)) |
| | 2 yy (child (y) → gets (y, doll)or gets (y, train) |
| | or gets (y, coal) |
| | 3) \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ |
| | 4) for all Z (child (z) and bad (z)) -> gets (z, coal)) Yy child (y) -> ! gets (y, train) |
| | 5] child (ram) -> arts (ram coal) |
| | 5) child (ram) -> gets (ram, coal) To prove (child (ram) -> bad (ram)) |
| | |
| | CNF Clayses |
| |]! boy (x) or child (x) |
| | i girl (x) or child (x) |
| | 2] ! child (y) or get (y, doll) or |
| | 2] ! child (y) or get (y, doll) or gets (y, et coal) |
| | 3] [boy (w) or ! gets (w, doll) |
| | 3] [boy (ω) or ! gets (ω, doll) |
| | 5) 1 child (ram) -> gets (ram, coal) |
| | G. had (ram) |

| | Resolution |
|---|--|
| | A) ! child (2) or ! bad (2) or get (2, coal). |
| | of bad (rigm) |
| | 7] ! child (ram) or gets (ram, coal) |
| | Substituting 2 by ram |
| 2 | 1) (a) 1 boy (x) or child (x) |
| | boy (ram) |
| | 8] child ram I substituting x by ram) 1] ! child (ram) or gets (ram, coal) |
| | 1] ! child (ram) or gets (ram, coal) |
| | 8] child (ram) |
| | g gets (ram, coal) |
| | I i child (y) (or gets (y, doll) or gets (y, train) or |
| ň | gets (y, coal) |
| | 8) Child (ram) |
| | 10] gets (ram, doll) or gets (ram, train) or gets |
| | (ram (coal) |
| | C Substituting y by ram) |
| | 9] gets (rgm, coal) |
| | 10] gets (ram, doll) or gets (ram, train) or gets.d |
| | (rgm, coal) |
| | 17 gets (ram, doll) or gets (ram, coal) |
| | 3] ! boy (w) or ! gets (w, doll) |
| | 5] boy (ram) |
| | 12] ! get (sqm, doll) (substituting w by sqm) |
| | in gets (ram, doll) or gets (ram, train) |
| | 12) 1 gets (ram, doi) |
| | 13) gets (ram, coal) |
| | c) <a> get (rgm, cogl) |
| | (3) gets (rgm, cog) |
| | Hence, bad (ram) is proved. |
| | ' ' |

| 0.2 | Differentiate between STRIPS and ADL | | |
|--------------|--|------------------------------|--|
| 2 88 | - it is a think in the same of | | |
| r the of the | STRTPS language | ADL | |
| The lates | | | |
| λ | Only 91100 positive | 1) Can Support both positive | |
| | literals in the States. | a negative literals | |
| | for eg : A valid Sentence | for eg: - same sentence | |
| oi. | is STRIPS is expressed as | is expressed as => | |
| | > Intelligent 1 Beautiful. | stupid N- ugly. | |
| | it ist ranger to the top | in the first and in | |
| <u>allei</u> | 2 STRIPS Stands for Standard | 2) Stands for Action | |
| | Research Institute problem | Description Language. | |
| | Solver. | . (J J | |
| | | | |
| | 3 Makes use of closed | 3 Makes use of open | |
| | world assumption (i.e.) | world Assymption (i.e.) | |
| | an mentioned literals | unmentioned literals | |
| - | gre false. | are unknown. | |
| | | • | |
| 6 | 1 We only can find ground | 1 We can find qualified | |
| | literals in goals. | Variables in goal. | |
| | for eg: - Intelligent 1 | for eg: - 7xAt[P!x] | |
| | Begytiful. | 1 At (P2, x) is the | |
| | | goal of having P1 & P2 | |
| | | in the some place in | |
| | | the example of blocks | |
| | 80 | | |
| | 5 Goals are conjunctions | 6) Goals may involve conjun- | |
| | for eg: - (Intelligent A | ctions & disjunctions for | |
| | Begutify) | eg:- (Intelligent 1 | |
| | | (Beautiful NRich)) | |
| | | | |

| | | Full Shibiters |
|-----------|--|--|
| | 6 Effects gre Conjunctions | @ Conditional effects are |
| | 127 | allowed when P: F means |
| | | Fis an effect only if |
| 5-16-12 | · It is a many in the world | P is satisfied |
| | ar a fil and on the section | · · · · · · · · · · · · · · · · · · · |
| 2.513 | 7 Does not support | 7 Equality Predicate |
| | equality. | CX = 4) is build in. |
| | pier vi invii - Whyte | The standing of the standing o |
| | 8 Des not have support | 8 Support for types |
| | for types | for eg: The variable |
| Ť. | En instrument instrum | P: person |
| | | , m, j. 2. |
| | | |
| | 200 00 - 1 2 PART 1 1 100 - 10 | 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1 |
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| 6 810 | with the witten or at serious | |
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| 2 1 34 | Villa - Marsa - Mars | |
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| ntry 1 = | retroit prom small () - marks | III y y was , and the |
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| | Laspithal Deliver | Control of the Contro |
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| VI |)ate : | 1 | 1 | |

| 130 L | the state was been and come and dependence |
|-------------------|--|
| 0.4 | You have two neighbors J&M, who have promised |
| ast will | to call you at work when they here the glarm. |
| man for | I always calls when he hears the glarm, but |
| | sometimes confused telephone ringing with |
| | glarms & calls then too. M likes loud music & |
| | sometimes misses the alarm together. Given, the |
| 111 | evidence of who has or has not called : we would |
| | like to estimate the probability of burglary. Draw |
| - 1.11 | a Bayesian network for this domain with |
| | Suitable probability table. |
| rk e | at and the case of the decident parents of the |
| \longrightarrow | P(B) |
| | [0.00] (Burglary) (Earthquake) [0.002] |
| of a const | was the state of t |
| - NT | |
| e josej s | (Alarm) B E P(A) |
| | F T 0-95 |
| 9 | T F 0-94 |
| - | F T 0:29 |
| ay you " | F F 0:00 |
| | |
| <u> </u> | (John (mary) |
| 2.30 | calls calls |
| | The state of the s |
| · | A PCT) A PGM). |
| 5(+10 | T 0.09. |
| | F 0.05 |
| | The topology of the network indicates that - Burglary & earthquake affect the probability of |
| | - Dyrglary & earthquake affect the probability of |
| | . The alaxms going off. |
| | |

| _ | |
|---|---|
| | - whether John and Mary call depends only on |
| | alarm. |
| | - They do not perceive any bunglaries directly they |
| , | do not notice minor earthquakes and they do |
| | not confer before calling |
| | 2] Mary listening to loud music & John confusing |
| | phone ringing to sound of alarm can be read |
| 1 | from network only implicitly as uncertainly |
| , | associated to calling at work |
| | 3) The probability actually symmarize potentially |
| | infinite set of circumstances |
| | - The glarm might full to go off due to high |
| | hymidity, power failure idead battery, cut wires, |
| | a dead mouse stude înside the bell, etc. |
| | - John and mary might fail to call and report |
| | & glarm because they are out to lynch, an |
| | vacation, temporarily deaf, passing helicopter, |
| | etc. |
| | 1) The condition probability tables in new gives |
| | probability for values of random variables |
| _ | depending an combination of values for the |
| | parent nodes |
| | 3 Each row must be sym to 1, because entries |
| | represent exhaustive set of cases for variable |
| | 6) All variables are Boolean |
| | I In general , a table for a Boolean variable with |
| | k parents contains 21 independently specific |
| | probabilities. |
| | 8) A variable with no parents has only one row, |
| | representing prior probabilities of each possible |
| | value of the variable. |
| | |

3) Every entry in full joint probability distribution can be calculated from information in Rayessian network. 10) A generic entry in joint distribution is probability of a conjunction of particular assignments to each variable P(XI = XI A A Xn = Xn) abbreviated as PC X1,, Xn) ii) The value of this entry is P(X1,, Xn) = Ti-1, np(1, parents (xi)), where parents s(xi) denotes the specific values of the variables parents (xi) - PCJAMAGANBANE) = P(jla) P(mla) P(alubane) P(ub) e(ue) = 0.09 x 0.07 x 0.001 x 0.999 x 0.998 = 0.000628 12] Baysesian Network mary John <u>ca115</u> C9/15 Farthquake Burglary Alarm