Module#4 (LogBook–Contents)

Submission deadline: February 13, 2024

1. Briefly describe the approaches of knowledge representation with example.

2. Differentiate between inference and reasoning. Why probabilistic reasoning is important in the AI? Explain with an example.

3. Why normal forms are required in AI? How do you convert to the disjunctive normal form? Explain all the steps with practical examples.

4. Define frame. How knowledge is encoded in a frame? Justify with an example.

5. In avillage, 1% of people have a certain genetic defect, 90% of test for gene defected people detect the defect. 9.6% of the test detect the positive result even if the person has no gene defect. If a person gets a positive test result, what are the odds they actually hae genetic defect?

6. Explain how statistical reasoning aids in inference and reasoning in light of Bayes theorem. At a certain University 5% of men are over 6 feet tall and 2% of women are 6 feet tall. 60% of students are female. If a student is selected at a random from among all those over six feet tall, what is the prob that the selected student is women?

7. Represent following sentence into semantic network

   birds are animal
   Birds have feathers, fly and lay eggs.
   Albatros is a bird.
   Donald is a bird.
   Tracy is an albatross.

8. Given premises:
   All oversmart person are stupid.
   Children of oversmart people are naughty.
   Ram is children of Hari.
   Hari is oversmart.

   👉 Show that Ram is naughty using FOPL based resolution method.

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9. Assume the following:

Horses, cows, pigs are animals.

An offspring of a horse is a horse.

Bluebeard is a horse.

Bluebeard is Charlie's parent.

Offspring and parent are inverse relation.

Every mammal has a parent.

☞ Prove Charlie is a horse using resolution refutation.

10. Assume the following facts:

john likes all kind of food.

Apples are food. Chicken is food.

Anything anyone eats and is not killed by is food.

Bill eats peanuts and is still alive.

Sue eats everything bill eats.

☞ Prove that John likes peanuts using resolution.

11. Assume following facts:

Dinesh likes all kinds of food.

Samosa's are food.

Cake is food.

Anything anyone eats and is not killed by is food.

Suresh eats peanuts and still alive.

Aashu eats everything suresh eats.

☞ First write all th clauses into predicates, then using resolution refutation method, prove that Dinesh likes peanuts.

12. Given premises:

Every American who sells weapons to hostile nations is criminal.

The country XYZ is enemy of America.

All of its missallies in XYZ were sold by Donald, who is an American.

☞ Prove that Donald is a criminal by using FOPL based resolution refutation method.

13. Given Premises:

It is a crime for an American to sell weapons to hostile nation.

Nono has some missiles.

All missiles owned by Nono were sold to it by Colonel West.

Missiles are weapons.

An enemy of America counts as hostile.

Colonel West is an American.

The country Nono, is an enemy of America.

👉 Prove that Colonel West is a criminal by using FOPL based Resolution Refutation method.

14. Consider following axioms:

    Every child love Santa.

    Everyone who loves Santa loves any reindeer.

    Rudolph is a reindeer, and Rudolph has a red nose.

    Anything which has a red nose is weird or is a clown.

    No reindeer is a clown.

    Scrooge does not love anything which is weird.

👉 Represent these axioms in a predicate calculus and then convert each formula to CNF.

15. Assume the following facts:

    Steve only likes easy courses.

    Science courses are hard.

    All the courses in basket weaving department are easy.

    BK301 is a basket weaving course.

👉 Prove that Steve likes BK301 course using Resolution Refutation method.