

LP II Artificial Intelligence

Practical No 6

Problem Statement: Implement any one of the following Expert System

- I . Information management
- II. Hospitals and medical facilities
- III. Help desks management
- IV. Employee performance evaluation
- V. Stock market trading
- VI. Airline scheduling and cargo schedules

Solution:

What is Expert System :

An Expert System is a computer program that acts like a human expert. It uses stored knowledge and logical rules to solve problems and give advice—just like a doctor or engineer would do.

Components of an Expert System:

1. **Knowledge Base:**

Stores facts and rules about a specific domain (e.g., medicine, law, engineering).

Example: “If a patient has a high fever and a sore throat, then the patient might have a throat infection.”

2. **Inference Engine:**

Applies logical rules to the knowledge base to deduce new facts or make decisions.

It's like the "brain" of the system.

3. User Interface:

Allows users (doctors, nurses, patients) to interact with the system by entering symptoms and getting diagnostic suggestions.

4. Explanation Facility:

Justifies the reasoning or diagnosis made by the system. (“The system recommends antibiotics because the symptoms match a bacterial infection.”)

5. Knowledge Acquisition Module:

Helps experts enter new knowledge or rules into the system.

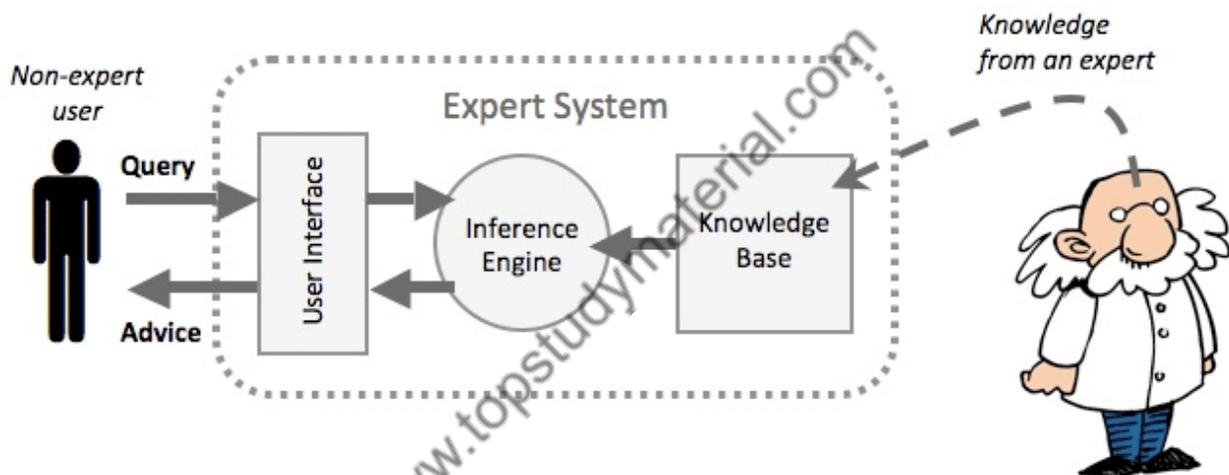


Diagram Expert System

Types of Expert Systems:

- Rule-Based Systems: Use “IF-THEN” rules.
- Frame-Based Systems: Use structures called frames to represent knowledge.
- Fuzzy Expert Systems: Deal with uncertain or imprecise data.
- Hybrid Systems: Combine different AI techniques (e.g., expert systems + machine learning).

```

public class SimpleExpertSystem {

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.println("Welcome to the Hospital Expert System!");
        System.out.print("Do you have fever? (yes/no): ");
        String fever = scanner.nextLine();

        System.out.print("Do you have cough? (yes/no): ");
        String cough = scanner.nextLine();

        System.out.print("Do you have sore throat? (yes/no): ");
        String soreThroat = scanner.nextLine();

        System.out.print("Do you have chest pain? (yes/no): ");
        String chestPain = scanner.nextLine();

        System.out.print("Do you have joint pain? (yes/no): ");
        String jointPain = scanner.nextLine();

        // Simple decision rules
        if (fever.equalsIgnoreCase("yes") && cough.equalsIgnoreCase("yes")) {
            System.out.println("You may have the flu.");
        } else if (fever.equalsIgnoreCase("yes") && soreThroat.equalsIgnoreCase("yes")) {
            System.out.println("You may have a throat infection.");
        } else if (chestPain.equalsIgnoreCase("yes")) {
            System.out.println("You may have a heart-related issue. Please see a doctor.");
        }
    }
}

```

```

    } else if (jointPain.equalsIgnoreCase("yes")) {
        System.out.println("You may have arthritis.");
    } else {
        System.out.println("Diagnosis unclear. Please consult a doctor.");
    }

    scanner.close();
}
}
}

```

Output:

Welcome to the Hospital Expert System!
 Do you have fever? (yes/no): **yes**
 Do you have cough? (yes/no): **yes**
 Do you have sore throat? (yes/no): **no**
 Do you have chest pain? (yes/no): **no**
 Do you have joint pain? (yes/no): **yes**
 You may have the flu.

How inference took place:

Inference means drawing conclusions based on the input (facts) and rules stored in the system.

Facts = User inputs (e.g., "fever = yes", "cough = yes")

Rules = IF-THEN logic (e.g., "If fever and cough, then flu")

Inference = Matching user input with rules to make a conclusion

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