



SNS COLLEGE OF ENGINEERING

(Autonomous)

DEPARTMENT OF CSE-IoT ENGINEERING



Artificial Intelligence & Natural Language Processing

Expert systems

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Expert systems

Expert systems (ES) are one of the prominent research domains of AI. It is introduced by the researchers at Stanford University, Computer Science Department.

What are Expert Systems?

The expert systems are the computer applications developed to solve complex problems in a particular domain, at the level of extra-ordinary human intelligence and expertise.

Characteristics of Expert Systems

- High performance
- Understandable
- Reliable
- Highly responsive



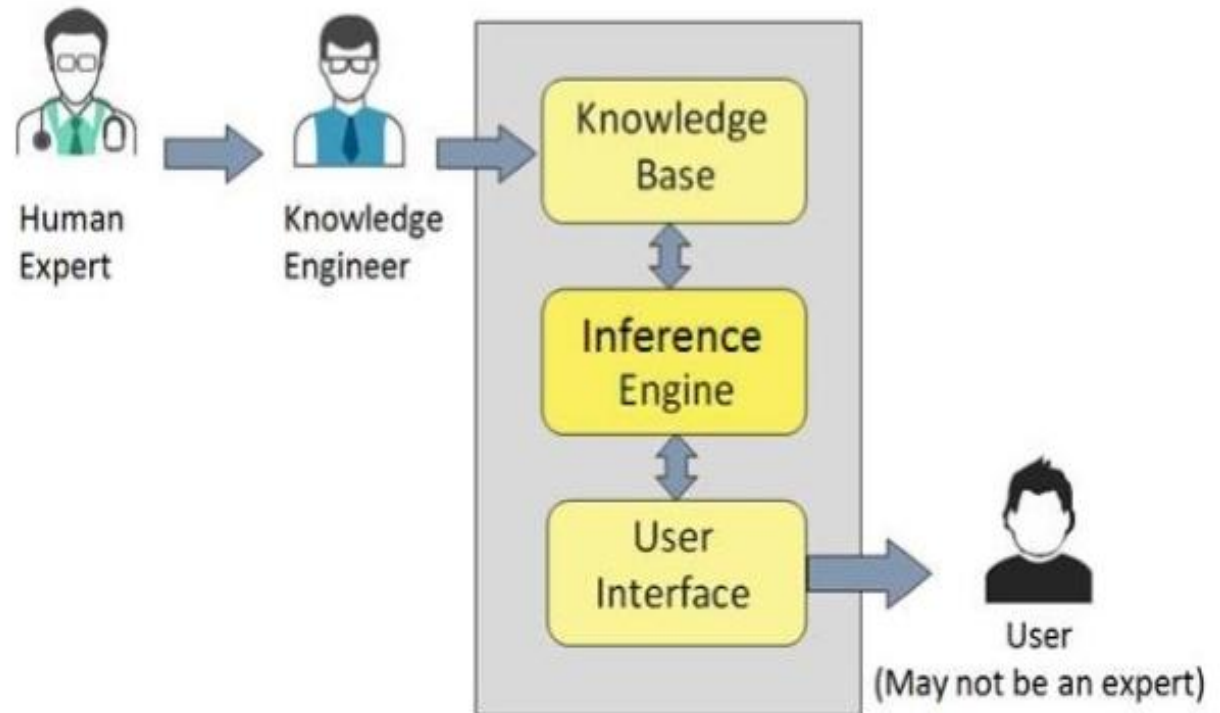
Capabilities of Expert Systems

- The expert systems are capable of –
 - ☐ Advising
 - ☐ Instructing and assisting human in decision making
 - ☐ Demonstrating
 - ☐ Deriving a solution
 - ☐ Diagnosing
 - ☐ Explaining
 - ☐ Interpreting input
 - ☐ Predicting results
 - ☐ Justifying the conclusion
 - ☐ Suggesting alternative options to a problem
- They are incapable of –
 - ☐ Substituting human decision makers
 - ☐ Possessing human capabilities
 - ☐ Producing accurate output for inadequate knowledge base
 - ☐ Refining their own knowledge



Components of Expert Systems

- The components of ES include –
 - ☐ Knowledge Base
 - ☐ Inference Engine
 - ☐ User Interface



Knowledge Base

- **Knowledge Base**

- ❑ It contains domain-specific and high-quality knowledge.
- ❑ Knowledge is required to exhibit intelligence. The success of any ES majorly depends upon the collection of highly accurate and precise knowledge.

- **What is Knowledge?**

- ❑ The data is collection of facts. The information is organized as data and facts about the task domain. **Data, information, and experience** combined are termed as knowledge.

Components of Knowledge Base

The knowledge base of an ES is a store of both, factual and heuristic knowledge.

❑ **Factual Knowledge** – It is the information widely accepted by the Knowledge Engineers and scholars in the task domain.

❑ **Heuristic Knowledge** – It is about practice, accurate judgement, one's ability of evaluation, and guessing.



Knowledge Base

Knowledge representation

It is the method used to organize and formalize the knowledge in the knowledge base. It is in the form of IF-THEN-ELSE rules.

Knowledge Acquisition

- The success of any expert system majorly depends on the quality, completeness, and accuracy of the information stored in the knowledge base.
- The knowledge base is formed by readings from various experts, scholars, and the Knowledge Engineers. The knowledge engineer is a person with the qualities of empathy, quick learning, and case analyzing skills.
- He acquires information from subject expert by recording, interviewing, and observing him at work, etc. He then categorizes and organizes the information in a meaningful way, in the form of IF-THEN-ELSE rules, to be used by inference machine. The knowledge engineer also monitors the development of the ES.



Thank you