Department of Computer Engineering

T.E. (Computer Sem VI)Assignment -2 Artificial Intelligence (CSC604)

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Assignment 2:

Considering the fallowing objectives :

CSC604.1: To grasp the fundamental concepts and methods involved in creating intelligent systems.

1. CSC604.2: Ability to choose an appropriate problem solving method and knowledge representation technique.
2. CSC604.3: Ability to analyze the strength and weaknesses of AI approaches to knowledge–intensive problem solving.
3. CSC604.4: Ability to design models for reasoning with uncertainty as well as the use of unreliable information.
4. CSC604.5: Ability to design and develop AI applications in real world scenarios.

A) what are the key considerations in designing an expert system that effectively utilizes knowledge representation techniques to handle uncertainty and unreliable information, while ensuring practicality in real-world applications?

B) Additionally, how do these considerations align with the strengths and weaknesses of various AI approaches to knowledge-intensive problem solving?"

1. Rubrics for the Second Assignments:

Indicator	Average	Good	Excellent	Marks
Organization (2)	Readable with some missing points and structured (1)	Readable with improved points coverage and structured (1)	Very well written and fully structured	
Level of content(4)	All major topics are covered, the information is accurate (2)	Most major and some minor criteria are included. Information is accurate (3)	All major and minor criteria are covered and are accurate (4)	
Depth and breadth of discussion and representation(4)	Minor points/information maybe missing and representation isminimal (1)	Discussion focused on some points and covers themadequately (2)	Information is presented indepth and is accurate (4)	
Total				

Signature of the Teacher

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AI Assignment 2

A) What are the key considerations in designing an expert system that effectively utilizes knowledge representation techniques to handle uncertainty and unreliable information, while ensuring practicality in real-world applications?

Ans: (1) Knowledge Representation: Use appropriate knowledge representation techniques such as rules, frames, semantic networks or probabilistic models to represent uncertain or unreliable information

(2) Uncertainty Handling: Implement methods to handle uncertainty such as probabilistic reasoning, fuzzy logic or Bayesian networks to model uncertain or unreliable information accurately.

(3) Inference Mechanism: Design an inference mechanism that can reason under uncertainty such as probabilistic inference algorithms or fuzzy inference systems, to make decisions based on incomplete or uncertain information

(4) Knowledge Acquisition: Develop effective methods for acquiring knowledge from domain experts, as uncertain or unreliable information may require more specialized expertise to represent accurately

(5) Integration with Real-World Data: Ensure the system can integrate with real-world data sources to update knowledge and handle dynamic environments

(6) Feedback and Learning: Implement mechanisms for the system to learn from feedback and update its knowledge base over time, improving its ability to handle uncertainty

B) Additionally, how do these considerations align with the strengths and weaknesses of various AI approaches to knowledge intensive problem solving?.

Ans:. ① Symbolic AI (Expert Systems):

Strengths: Expert systems excel at representing human knowledge and reasoning with uncertain or incomplete information using rules and heuristics

Weaknesses: They can struggle to handle complex and uncertain environments as they rely heavily on predefined rules and may not adapt well to new or changing situations

② Probabilistic AI (Probabilistic Graphical Models):

Strengths: Probabilistic models are well-suited for representing and reasoning with uncertain information, providing a principled way to handle uncertainty

Weaknesses: They can be computationally expensive and may struggle with very dynamic environments where the underlying probabilities are not well defined.

③ Fuzzy Logic:

Strengths: Fuzzy logic is effective for modelling and reasoning with vague or imprecise information, providing a more nuanced approach to handling uncertainty

Weaknesses: It may require more complex rules and mechanisms to implement and its results might not always align with human intuition.

④ Machine Learning (e.g. Neural Networks):

Strengths: Machine learning excels at learning patterns and relationships from data, making it well-suited for handling uncertainty and making predictions

Weakness: It may require large amounts of data for training and can be opaque in terms of understanding the reasoning behind its decisions.