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

Assignment-2 9612 Gaurav Joshi   TE comps A

→A) key considerations in designing expert system are :-

1 knowledge Representation : Choose appropriate represent-ation techniques like probabilistic models, fuzzy logic, or Bayesian network to capture uncertainty effectively.

2. Inference Mechanisms : Implement robust inference mechanisms that can reason under uncertainty such as probalistic reasoning, fuzzy reasoning, or Bayesian inference.

3. Uncertainty Management : Develop strategies to quantify & manage uncertainty, including techniques like belief revision, evidence accumulation, or Dempster-Shafer theory.

4. Adaptability & Learning: Design the system to adapt & learn from feedback, refining its knowledge & improving its performance over time in real world environments.

5. Scalabity & Performance : Design the system to be scalable & efficient, capable of handling large amounts of data & making timely decisions in real-world applications.

→ B) Considerations that align with strengths & weakness of various AI approaches:

• Symbolic AI: Strengths sinclude explicit knowledge representation & transparent reasoning, but it may struggle with handling uncertainty & real-world complexity effectively.

• Probabilistic AI: Strengths lie in probabilistic modelling & uncertainty management, making it well-suited for handling uncertain & unreliable information.

• Fuzzy logic: Strengths include its ability to handle vagueness & uncertainty in a natural way. However, it may struggle with scaling to large & complex knowledge domains.

• Machine Learning: Strengths include its ability to learn from data & adapt to complex patterns, making it suitable for real-world applications with uncertain & unreliable information. However it may lack transparency & struggle with providing explanations for its decisions.

• Strengths: a) Techniques like Bayesian networks & fuzzy logic excel at handling uncertainty & unreliable information aligning well with the objective of designing models for reasoning under uncertainity (CSC 604.4)

b) Expert systems when properly designed, can effectively leverage knowledge representation techniques to solve complex problems in specific domains, aligning with the objective of knowledge intensive, problem-solving (CSC-604.3)}

• Weakness:

a) Some AI approaches may struggle with scalability & efficiency, particularly when dealing with larg amounts of uncertain or unreliable data, which could impact the particality of real-world applications (CSC 604.5)

b) Over-reliance on domain experts for knowledge acquistion in expert systems can introduce biases or inaccuracies, potentially undermining the systemis effectiveness (CSC 604.2)

c) Validation & verification of expert systems can be challenging, especially when dealing with uncertainty as it may be difficult to establish ground. truth for testing purposes (CSC 604.3)