E sem VII / IT / C-scheme / Nov 25 / 26.11.25
comp
EXTC
Mech
op code. 97512

Time: 3 Hours Marks: 80

N.B.: 1) Question No. 1 is compulsory.
2) Answer any three out of remaining questions.
3) Assume suitable data if necessary.
4) Figures to the right indicate full marks.

Q1. (a) Explain why AI is considered a multifaceted discipline. Provide examples from different domains. **(5)**

Q1. (b) Demonstrate how conversational AI can assist in patient engagement and monitoring in digital health systems. **(5)**

Q1. (c) What are the key stages in the AI/ML model development workflow? **(5)**

Q1. (d) Explain the concepts of personalized medicine and connected medicine. **(5)**

Q2. (a) Define Knowledge Discovery in Databases (KDD) and explain how it relates to Data Mining and Machine Learning. **(10)**

Q2. (b) Critically discuss the ethical concerns related to the use of Artificial Intelligence, particularly in sensitive fields like healthcare and finance. How can bias in models be identified and mitigated? **(10)**

Q3. (a) Explain Ensemble Learning, and how does it differ from Multi-classifier Decision Fusion? **(10)**

Q3. (b) How can AI techniques be applied in drug discovery and follow-up care? Give a real-world healthcare use case. **(10)**

Q4. (a) List and briefly explain the NLP methods commonly used in healthcare data analysis. **(10)**

Q4. (b) Discuss dimensionality reduction techniques used to handle high-dimensional medical data? **(10)**

Q5. (a) An AI-based diagnostic tool is tested to detect COVID-19 in patients. A dataset of 120 patients is used for testing, and the confusion matrix is given below:

Table 1: Confusion Matrix

	Predicted Positive	Predicted Negative
Actual Positive	50	10
Actual Negative	15	45

Based on this confusion matrix, define and calculate the following:
Accuracy, Precision, Recall (Sensitivity), F1-score **(10)**

Q5. (b) Explain the concept of guided search for disease information in iPHR systems. Why is it important for patients? **(10)**

Q6. Explain **any Two**: **(20)**
a) Blockchain in healthcare
b) Genetic Algorithm
c) Augmented Reality (AR)
d) Deep Learning

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