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Question Paper Code:1217005

B.E. / B.Tech. DEGREE EXAMINATIONS, NOV/ DEC 2024
Seventh Semester
Biomedical Engineering
U20BM702 – ARTIFICIAL INTELLIGENCE IN HEALTHCARE
(Regulation 2020)

Time: Three Hours   Maximum: 100 Marks

Answer All Questions

PART – A   (10 x 2 = 20 Marks)

1.   Define Fuzzy Systems and provide one application in real-world problem-solving.

2.   What is evolutionary programming and how is it different from Genetic Algorithms?

3.   List two ethical concerns related to AI in healthcare.

4.   What does accountability mean in the context of AI ethics?

5.   What is dimensionality reduction, and why is it important?

6.   Differentiate between feature selection and feature extraction.

7.   Define a convolution operation in CNNs.

8.   How do RNNs handle sequential data?

9.   What is phenotype discovery in healthcare?

10. Define tissue morphology in medical imaging.

PART – B   (5 x 16 = 80 Marks)

11. (a) Explain the architecture and working of Artificial Neural Networks. How do ANNs learn from data? Discuss the classification of ANNs and the types of problems they can solve.   (16)

(OR)

(b) Compare and contrast Perceptron, Adaline, and Madaline networks in terms of architecture, learning rules, and applications. Provide examples of where each network type is effectively used.   (16)

12. (a) Evaluate the ethical considerations of AI in machine learning, particularly in terms of bias, fairness, accountability, and transparency. Discuss how these factors can affect decision-making processes in real-world applications. (16)

(OR)

(b) Summarize the social implications of using AI in healthcare. What are the potential risks and benefits, and how can stakeholders ensure that AI systems are used in a way that is ethical and equitable? (16)

13. (a) Outline the working of decision trees in supervised learning. Explain the concepts of entropy, information gain, and how decision trees make classification decisions. (16)

(OR)

(b) Outline the semi-supervised learning. How does it combine supervised and unsupervised approaches? Provide examples of how semi-supervised learning is used in real-world applications where labeled data is scarce. (16)

14. (a) Compare the neural basis of computing and its relation to artificial neural networks. How do biological neurons inspire the structure and function of artificial neural networks? (16)

(OR)

(b) Interpret the vanishing gradient problem in deep learning? How does it affect the training of deep neural networks, and what techniques are used to mitigate this issue? (16)

15. (a) Analyze the role of clinical decision support systems (CDSS) in supporting evidence-based medicine. How do these systems assist healthcare professionals in making informed decisions, and what are the challenges of implementing them effectively? (16)

(OR)

(b) Analyze the impact of AI on the evolution of personalized medicine. How has AI-driven phenotype and bio-marker discovery enabled more customized treatment plans, and what are the future trends in this field? (16)

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