A close-up of a white background

Description automatically generated

**Assignment 3**

Subject: Artificial Intelligence Subject Code: AI 302T

Class: B.Tech CSE 3rd Faculty Name: Dr Neha Jain, Ms. Reeta Mishra

Date of Issue: 16/3/24 Date of Submission: 22/3/24 Total Marks: 20

**All questions are compulsory to attempt.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S.No. | Questions | Max Marks | CO | BL |
| 1 | Provide a comprehensive explanation of natural language processing. Define key NLP concepts, such as syntactic and semantic analysis, and discuss the challenges associated with processing human languages by computers. | 3 | CO3 | L2 |
| 2 | Develop a strategy for incorporating genetic learning in a game-playing scenario. Outline how genetic algorithms could be used to evolve strategies for an AI player. Provide a step-by-step explanation of the application, considering factors such as population initialization, fitness evaluation, and reproduction. | 4 | CO3 | L3 |
| 3 | Given a set of examples, apply explanation-based learning to derive general rules or knowledge. Illustrate how explanation-based learning can be used to improve the performance of an AI system in a specific domain. | 4 | CO3 | L3 |
| 4 | Design an application that utilizes natural language processing to solve a practical problem. Specify the components of your NLP application and discuss how it processes and understands human language to achieve its goal. | 5 | CO3 | L3 |
| 5 | Compare and contrast discovery, analogy, neural network learning, and genetic learning as approaches to machine learning. Analyze the strengths and limitations of each approach, providing examples of scenarios where one might be more effective than the others. | 5 | CO3 | L4 |

A close-up of a white background

Description automatically generated

**Assignment 4**

Subject: Artificial Intelligence Subject Code: AI 302T

Class: B.Tech CSE 3rd Faculty Name: Dr Neha Jain, Ms. Reeta Mishra

Date of Issue: Date of Submission:

Total Marks: 20

**All questions are compulsory to attempt.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S.No. | Questions | Max Marks | CO | BL |
| 1 | Analyze the application of fuzzy logic systems in decision-making processes. Discuss scenarios where traditional Boolean logic may fall short and explain how fuzzy logic addresses these limitations. Evaluate the trade-offs and benefits of using fuzzy logic in specific applications. | 5 | CO2 | L3 |
| 2 | Critically evaluate the role of perception and action in robotic systems. Analyze how sensor inputs influence decision-making and action execution in autonomous robots. Discuss challenges and strategies for improving the integration of perception and action in real-world robotic applications. | 3 | CO2 | L3 |
| 3 | Analyze the components and working of expert systems. Evaluate how knowledge representation, rule-based reasoning, and domain expertise contribute to the decision-making capabilities of expert systems. Discuss limitations and propose enhancements to improve their effectiveness. | 4 | CO2 | L4 |
| 4. | State different strategies for performing inference in Bayesian Networks. Combine methods such as exact inference, approximate inference, and sampling techniques. Develop a comprehensive approach for selecting the most suitable inference strategy based on the characteristics of the network and the available data. | 3 | CO2 | L5 |
| 5. | Synthesize a hybrid clustering algorithm by combining the K-means clustering algorithm with another clustering technique, such as hierarchical clustering or density-based clustering. Justify the design choices and discuss how the hybrid approach enhances the performance and flexibility of the clustering algorithm. | 5 | CO2 | L5 |