Assignment-1: Introduction to Machine Learning Techniques

1. Define Machine Learning and exemplify its real-world applications across various domains.
2. List and explain the significant challenges faced within the field of Machine Learning.
3. Break down the components of machine learning using practical examples for clarity.
4. Elaborate on the importance of generalization and evaluation in the context of machine learning models.
5. Define noisy data and illustrate its effects on the overall machine learning process.
6. Define: overfitting, underfitting, model training, evaluation, and meta-learning for comprehensive understanding.
7. Outline the stages involved in deploying Machine Learning algorithms for practical application.
8. Summarize the advantages and challenges in using predictive analytics and machine learning methodologies.
9. Distinguish predictive and descriptive models in Machine Learning with illustrative examples for each.
10. Differentiate supervised and unsupervised learning, citing at least two algorithms for each category.
11. Highlight the advantages and challenges associated with using predictive analytics and machine learning techniques.
12. Compare instance-based and model-based learning approaches, detailing their fundamental differences.
13. Compare online and batch learning systems within the scope of Machine Learning methodologies.
14. Define reinforced learning and provide an illustrative example to enhance comprehension.
15. Explain the characteristics of Nearest Neighbor Learning as a Lazy Learning method and its traits.
16. Contrast Lazy Learning and Eager Learning approaches with examples for better understanding.
17. Explore the impact of noise in the nearest neighbor algorithm, especially regarding group distinctions.
18. Explain prediction through KNN and the significance of distance metrics in the nearest neighbor classifier.
19. Define the Curse of Dimensionality in KNN and its influence on the algorithm's performance.
20. Demonstrate distance computation with KNN for non-numeric attributes through practical numeric examples.
21. Provide examples illustrating distance computation with KNN for numeric attributes in the learning process.
22. Identify problem types that can be addressed using the Naive Bayes Classifier in various scenarios.
23. Offer a numerical example demonstrating the Bayes classifier's usage in text classification/NLP with pros and cons.

24. Present practical applications where the Bayes Classification method can be effectively employed.
25. Explain the role of decision trees in supervised learning, supporting the explanation with a relevant example.
26. Differentiate between classification and regression trees to understand their distinct functionalities in learning processes.
27. Describe how decision trees are used to generate classification rules, highlighting their advantages and disadvantages.
28. Illustrate the building of a predictive model using a decision tree classifier through numerical demonstrations.
29. Provide an overview of the C5.0 decision tree algorithm, explaining its classification methodology briefly.
30. Explain the concept of pruning in decision tree algorithms, its necessity, and the various methods used for pruning.