Self test Questions for Slides Set #4

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These questions should help review the key concepts presented in the slides!

Introduction to Machine Learning:

1. What is the primary goal of machine learning algorithms?

2. What are the typical inputs and outputs of a learning algorithm in machine learning?

3. Why is it important to define training data, learning process, and success evaluation in ML?

Justification for Machine Learning:

4. How did early intelligent applications differ from modern machine learning systems?

5. Why is manually coding decision rules not scalable for all tasks?

6. What are the two major disadvantages of hand-coded rule-based systems?

Why Hand-Coded Systems are not Sufficient:

7. Why is detecting faces in images difficult with hand-coded systems?

8. How does machine learning overcome the challenge of detecting faces in images?

Supervised Learning:

9. What is supervised learning, and how does it differ from other types of learning?

10. How does a supervised learning algorithm generalize from input-output pairs to make predictions for new inputs?

11. How does a machine learning system learn a functional relationship, like the square of a number, from training data?

Supervised ML Examples:

12. What is the task in the example of identifying pincode from handwritten digits?

13. In the example of detecting fraudulent credit card transactions, what type of input does the algorithm receive?

14. How would a machine learning model be trained to determine whether a tumor is benign or malignant?

Formal Definition of Supervised Learning:

15. What is the role of the feature vector $\mathbf{x}$ in supervised learning?

16. How does the prediction function $g(\mathbf{x})$ work in supervised learning?

17. What does the prediction function g exclude when determining the relationship between input and output?

Unsupervised Learning:

18. What is the key difference between supervised and unsupervised learning?

19. In anomaly detection, what kind of data does the learner receive for training?

Unsupervised Learning Examples:

20. What are some common applications of unsupervised learning?

21. How can unsupervised learning be used to segment customers into groups?