

Module 1- Introduction to ML and Concept Learning

Introduction to Machine Learning (Chapter 1)

1. Define Machine Learning. Discuss with examples why machine learning is important.
2. Discuss with examples some useful applications of machine learning.
3. Explain how some areas/disciplines that influenced the machine learning.
4. What do you mean by a well-posed learning problem? Explain the important features that are required to well-define a learning problem.
5. Define learning program for a given problem. Describe the following problems with respect to Tasks, Performance and Experience:
 - a. Checkers Learning Problems
 - b. Handwritten Recognition Problem
 - c. Robot Driving Learning Problem
6. Describe in detail all the steps involved in designing a learning system.
7. Discuss the perspective and issues in machine learning.

Concept Learning (Chapter 2)

8. Define Concept and Concept Learning. With example explain how the Concept Learning task determines the Hypothesis for given target concept.
9. Discuss Concept learning as search with respect to General to specific ordering of hypothesis.
10. Describe Find S Algorithm. What are the properties and complaints of Find S.
11. Illustrate Find S Algorithm over *EnjoySport* concept. Training instances given below.

Example	<i>Sky</i>	<i>AirTemp</i>	<i>Humidity</i>	<i>Wind</i>	<i>Water</i>	<i>Forecast</i>	<i>EnjoySport</i>
1	Sunny	Warm	Normal	Strong	Warm	Same	Yes
2	Sunny	Warm	High	Strong	Warm	Same	Yes
3	Rainy	Cold	High	Strong	Warm	Change	No
4	Sunny	Warm	High	Strong	Cool	Change	Yes

12. Define Consistent *Hypothesis* and *Version Space*. With example explain Version Space and Representation of version Space.
13. Describe List the Eliminate Algorithm.
14. Explain the candidate elimination algorithm.

15. Trace Candidate-Elimination algorithm on the following data.

a)

<i>Origin</i>	<i>Manufacturer</i>	<i>Color</i>	<i>Decade</i>	<i>Type</i>	<i>Example Type</i>
Japan	Honda	Blue	1980	Economy	Positive
Japan	Toyota	Green	1970	Sports	Negative
Japan	Toyota	Blue	1990	Economy	Positive
USA	Chrysler	Red	1980	Economy	Negative
Japan	Honda	White	1980	Economy	Positive

b)

<i>Origin</i>	<i>Manufacturer</i>	<i>Color</i>	<i>Decade</i>	<i>Type</i>	<i>Example Type</i>
Japan	Honda	Blue	1980	Economy	Positive
Japan	Toyota	Green	1970	Sports	Negative
Japan	Toyota	Blue	1990	Economy	Positive
USA	Chrysler	Red	1980	Economy	Negative
Japan	Honda	White	1980	Economy	Positive
Japan	Toyota	Green	1980	Economy	Positive
Japan	Honda	Red	1990	Economy	Negative

c)

<i>Example</i>	<i>Sky</i>	<i>AirTemp</i>	<i>Humidity</i>	<i>Wind</i>	<i>Water</i>	<i>Forecast</i>	<i>EnjoySport</i>
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16. Explain the inductive biased hypothesis space, unbiased learner and the futility of Bias Free Learning. Describe the three types of learner.

17. What is the role of a function approximation algorithm? How does learner system estimate training values and adjusts weights while learning?

18. Describe in brief: Version spaces and Candidate –Elimination Algorithm.

19. Define Inductive Learning Hypothesis.

20. Describe Inductive Systems and Equivalent Deductive Systems

21. Rank the following three types of learners according to their biases:

- Rote Learner
- Candidate Elimination Learner
- Find S Learner.

Reference: <https://proftgs.blogspot.com>