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14SCS41

Fourth Semester M.Tech. Degree Examination, Dec.2017/Jan.2018

Machine Learning Techniques

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions.

- 1 a. Define concept learning. Explain concept learning task with example. (08 Marks)
- b. Explain in detail candidate elimination algorithm using version spaces. (06 Marks)
- c. Write down the version space using candidate elimination algorithm, taking the enjoy sports concepts and training instances given below:

Example	Sky	Air temp.	Humidity	Wind	Water	Forecast	Enjoy sport
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

(06 Marks)

- 2 a. Consider the below table and solve using the ID3 algorithm with decision tree. Consider attribute values:

Outlook (Sunny, Rainy)
 Temperature (Hot, Cool)
 Humidity (High, Normal)
 Wind (Strong, Weak)

Dry	Outlook	Temperature	Humidity	Wind	Play tennis
D ₁	Sunny	Hot	High	Strong	Yes
D ₂	Sunny	Hot	High	Strong	Yes
D ₃	Rainy	Hot	High	Strong	Yes
D ₄	Rainy	Hot	High	Strong	Yes
D ₅	Sunny	Cool	Normal	Weak	No
D ₆	Sunny	Cool	High	Weak	No
D ₇	Rainy	Hot	Normal	Weak	No
D ₈	Rainy	Cool	Normal	Weak	No

(10 Marks)

- b. Explain the gradient decent algorithm along with derivation. (10 Marks)

- 3 a. Explain genetic operators, illustrate with single point, two point and uniform cross over. (08 Marks)

- b. Explain the prototypical genetic algorithm. Illustrate with gabil system. (12 Marks)

- 4 a. Explain the following components of artificial neural networks:

- i) Perceptrons (10 Marks)
- ii) Representational power of percenptrons

- b. Prove that posterior probability of hypothesis H (H is consistent with D) is inversely proportionate to version space of H with respect to D by using bayes theorem. (05 Marks)

- c. Explain MAP and ML hypothesis. (05 Marks)

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- 5 a. Explain Naïve bayes classification with example. (10 Marks)
b. Explain the probably approximately correct (PAC) learning model. (10 Marks)
- 6 a. Explain mistake bound model for learning and apply it to find S-algorithm. (10 Marks)
b. Explain locally weighted linear regression. (10 Marks)
- 7 a. Explain first order Horn clauses with example. (06 Marks)
b. Explain the K-nearest neighbor learning with example. (06 Marks)
c. List out various evaluation functions used in LEARN-ONE rule? Explain. (08 Marks)
- 8 a. Differentiate between FOCL and FOIL approach with respect to hypothesis space search. (10 Marks)
b. Explain the following learning techniques:
i) Deductive
ii) Knowledge level learning
iii) Inductive bias learning (10 Marks)

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