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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

August 2022 Semester End Main Examinations

Programme: B.E.

Semester: VI

Branch: Computer Science and Engineering

Duration: 3 hrs.

Course Code: 20CS6PCMAL

Max Marks: 100

Course: Machine Learning

Date: 10.08.2022

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

UNIT - I

- 1 a) With a neat diagram, explain the final design of checkers learning system. 05
 b) Discuss the issues in Machine Learning. 05
 c) Apply the Candidate Elimination Algorithm for the following training examples to obtain final version space. 10

S.No	Sky	AirTemp	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

OR

- 2 a) Write ID3 algorithm for Decision Tree Learning. 10
 b) Apply ID3 algorithm for constructing decision tree for the following examples. 10

Day	Outlook	Tempera ture	Humidity	Wind	PlayTennis
D1	Sunny	Hot	High	Weak	No
D2	Sunny	Hot	High	Strong	No
D3	Overcast	Hot	High	Weak	Yes
D4	Rain	Mild	High	Weak	Yes
D5	Rain	Cool	Normal	Weak	Yes
D6	Rain	Cool	Normal	Strong	No
D7	Overcast	Cool	Normal	Strong	Yes
D8	Sunny	Mild	High	Weak	No
D9	Sunny	Cool	Normal	Weak	Yes
D10	Rain	Mild	Normal	Weak	Yes
D11	Sunny	Mild	Normal	Strong	Yes
D12	Overcast	Mild	High	Strong	Yes
D13	Overcast	Hot	Normal	Weak	Yes
D14	Rain	Mild	High	Strong	No

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
Revealing of identification, appeal to evaluator will be treated as malpractice.

UNIT - II

- 3 a) Estimate the difference between the true errors of two hypothesis h_1 and h_2 . Use the general approach for deriving the confidence interval for d . What is the probability distribution governing the random variables? Obtain the approximate variance of each distribution. 10
- b) Write the procedure to estimate the difference in error between two learning methods. 10

UNIT - III

- 4 a) Discuss how Brute-Force MAP Learning algorithm generates MAP hypothesis for concept learning problem 10
- b) Construct a Naïve Bayes classifier to predict a person is suffering from disease 'Z'. Classify the below new instance using built model. 10

A person who has no fever but suffers from high blood pressure, diabetes and vomiting is suffering from a disease 'Z' or not.

X Variables				Y Variable
Blood Pressure	Fever	Diabetes	Vomit	Suffering from disease 'Z'
high	high	yes	no	no
high	high	yes	yes	no
low	high	yes	no	yes
normal	mild	yes	no	yes
normal	no fever	no	no	yes
normal	no fever	no	yes	no
low	no fever	no	yes	yes
high	mild	yes	no	no
high	no fever	no	no	yes
normal	mild	no	no	yes
high	mild	no	yes	yes
low	mild	yes	yes	yes
low	high	no	no	yes
normal	mild	yes	yes	no

OR

- 5 a) Discuss Bayesian Belief Networks with an example. 10
b) Consider below scenario,

The following are the temperature data recorded for 10 random days.

Days = {70, 62, 89, 54, 97, 75, 82, 56, 32, 78}

Given the days can experiment variations around 10 degrees. Assuming that data follows gaussian distribution, identify the algorithm which can determine its mean values and discuss the same.

UNIT - IV

- 6 a) Explain Locally Weighted Linear Regression. 10
b) Consider any prototypical example and discuss case-based reasoning system. 10

UNIT - V

- 7 a) Write the FOIL algorithm and discuss how first order rules are learnt for a 10
given concept.
- b) Demonstrate how Sequential Covering algorithm builds disjunctive set of 10
rules.

B.M.S.C.E. - EVEN SEM 2021-22

