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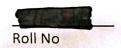
Applied Machine Learning

(CS4104)

Date: Feb 24th 2025

Course Instructor(s)

Dr Kashif Zafar Mr Razi Uddin Ms Anosha Khan





Sessional-I Exam

Total Time (Hrs):

Total Marks: 20

Total Questions: 2



Instructions:

- Attempt all questions on answer book
- Show complete working step by step

CLO # 2: Apply supervised learning techniques to solve classification problems

Q1: [13 points]

A zoologist is working on a classification project to identify two different types of creatures on a newly discovered planet: Type M and Type H (M= Martians (fictional creature belongs to Mars) & H (Human). The zoologist has collected data on four physical characteristics: Color (Green or Not Green), number of Limbs (2 or 3), Size (Small or Tall), and whether or not the creature is Odorous (Yes or No). The data collected is as follows:

	Creature Type	Color	Limbs	Size	Odorous
X	M	No	3	Small	Yes
12	M -	Yes	2	Tall'	· No
×3	The same of the sa	Yes	3	Tall	- No
A	<u>M</u>	No_	_2	Smal1-	- Yes
x5	M	Yes	3	Tall	No
G	M	No	2	Tall	Yes
117	H	No	2	Small	No
0 1	H	No	2	Tall	No
18	H	Yes	2	Small	No
9	H	No	2	Tall	Yes



Which attribute would the ID3 algorithm choose to use for the root of the tree (no pruning)? [2 points]

Draw the full decision tree that would be learned for this data. [8 points]

Suppose we have a validation set as follows. What will be the prediction of the tree for each test instance. [3 points]

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Color	Limbs	Size	Odorous
Yes	2	Tall	No
No	3	Small	Yes
Yes	3	Small	Yes

CLO # 2: Apply supervised learning techniques to solve classification problems

Q2: [7 points]

You are given the following dataset, where the goal is to predict the "Marks (%)" based on the features "Study Method" and "Attendance Level" using a regression tree model:

Study Method	Attendance	Marks (%)
Online	High	90
Offline	Low	60
Online	Medium	75
Offline	High	85
Hybrid	Low	65

| A | Build Regression Tree for the above dataset? Stop splitting further if less than 3 training examples left in a branch. (5 points)

