Badji-Mokhtar university Annaba

28/05/2025

Departement of computer science

Introduction to Artificial Intelligence (IAI)

Duration : 01H30

MIAGE L1

Exercise 1 (6 points): Answer the following questions :

Q1 : List one misconception about AI

Q2: Cite one difference between traditional AI and modern AI

Q3: List two main uses of AI in finance

Q4: What is the goal of supervised learning ?

Q5: What type of data is used in unsupervised learning ?

Q6: List two metrics that can be used to evaluate a regression model

Exercise 2 (8 points):

A healthcare center wants to predict whether patients are at risk based on certain personal and lifestyle data presented in the dataset below :

Patient id	Age group	Exercise frequency	Smoking status	BMI category	Risk
1	Young Adult	Daily	Non-smoker	Normal	No
2	Middle-aged	Sedentary	Smoker	Obese	Yes
3	Senior	Light/Occasional	Ex-smoker	Overweight	No
4	Middle-aged	Daily	Non-smoker	Normal	No
5	Young Adult	Light/Occasional	Non-smoker	Overweight	Yes
6	Senior	Sedentary	Smoker	Obese	Yes
7	Senior	Light/Occasional	Non-smoker	Overweight	No
8	Young Adult	Sedentary	Smoker	Obese	Yes
9	Senior	Sedentary	Ex-smoker	Obese	Yes
10	Middle-aged	Daily	Non-smoker	Normal	Yes

1. Identify the problem type and the target variable.

2. Construct a decision tree using ID3 algorithm to classify the target variable.

3. Draw the final decision tree.

4. Use the tree to predict the outcome for the following profile : Age group=Young adult , exercise frequency= sedentary, smoking status =smoker, BMI category=Overweight.

Exercise 3 (6 points): An energy company is trying to model how household electricity usage (in kilowatt-hours) relates to monthly electricity bills (in DZD). The company collected data from 8 different houses :

Houses	Electricity usage	Monthly bill (DZD)
H1	120	540
H2	150	670
H3	180	810
H4	200	890
H5	220	960
H6	250	1070
H7	270	1160
H8	300	1280

1. Plot the data on a graph.

2. Compute the Linear Regression Line using the slope (m) and the intercept (b) .

3. Use the regression model to predict the monthly bill for: 160 kWh and 280 kWh.

4. Using Python and scikit-learn, write the code to split the data into training and test sets (with 20% test size), train a linear regression model on the training data, and predict the target values for the test data.

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5. Print the predicted values for the test set.