Machine Learning - Assignment I

**Video Link:** https://drive.google.com/file/d/1-D5SbPUaAsx-YzR\_wyL6gV1DiDy7oKl4/view

**GitHub Link:** https://github.com/Kalyansai6/Machine-Learninhg

Q1) Sort the list of ages, find min and max, average, median and range #Importing library called statistics which helps in calculating mathematical data import statistics

ages = [19, 22, 19, 24, 20, 25, 26, 24, 25, 24]

# Sorts age list in ascending order by default

ages.sort()

print ("Sorted age:", ages) # Displays sorted values

# Minimum age

# Displays min value as we used min() method print ("Min:", min(ages))

# Maximum age

# Displays max value as we used max() method print ("Max:", max(ages))

# Adding again min and max values so we use append() method to insert values to the list ages.append(min(ages))

ages.append(max(ages))

print ("Added min and max values again:",ages) #Displays the list again with new values

# Median (one middle item or two middle items divided by two, as we imported statistics library it calculates easily and provides the opt)

mdn\_age = statistics.median(ages) print ("Median:", mdn\_age)

# Average age

average= sum(ages)/len(ages) print ("Avg = ", average)

# Range

rng=max(ages)-min(ages) print ("Range = ", rng)

Graphical user interface, text, application

Description automatically generated

Description: In the above source code, firstly we imported a library called statistics which will be useful for our calculations. Then we have inserted a data with integer type in list, we performed finding minimum and maximum age using Min() and Max() functions. Next we added them using append() and then we calculated Median, Average And Range using formulas and function.

Q2) Create a dictionary

# Dog dictionary is created with given key and values

dog = {'name':'Tommy','color':'white','breed':'husky','legs':'4','age':'2'} print ("Dog Dictionary Created:",dog)

# Student dictionary is created with given key and values

student =

{'first\_name':Kalyan,'last\_name':Badeti,'Gender':'Male','age':'26','marital\_status':'single',

'skills':'sportsperson','Country':'India','City':'Hyderabad','Address':'1/148'} print ("Student Dictionary Created:",student)

# Create another dictionary for skills

**skills = {'sportsperson':'1','singer':'2','coder':'3'} print ("Skills Dictionary Created:",skills)** # Find the length of student dictionary

print ("Length of student:", len(student))

# Check the datatype of skills

print ("Datatype of skills:",type(skills))

# Get values of skills dictionary

print ("Values of skills:",skills.values())

# Add one item to skills

skills['artist'] = 4

print ("New skill added:",skills)

# Get dog and student key and values

print ("Dog keys:",dog.keys())

print ("Student values:",student.values())

Text

Description automatically generated

**Description:** In the above source code we have created dictionary with keys and values and printed them on screen. Then we created student and skills dictionary and given values and printed them onscreen. Now we calculated length, datatype using len() and type(). We added an item to skill then printed the dog keys and student values using print().

Q3) Create tuple of sisters and brothers

my\_sisters = ('Mounica', 'Durga','Pavani','Ayesha') my\_brothers = ('Sriman','Sriram','Prasad','Santosh')

# Create another tuple as siblings and join the sister’s and brother’s tuple

siblings = my\_sisters + my\_brothers

# Displays siblings’ output and length of siblings

print("Siblings:", siblings) print("Length of Siblings:", len(siblings))

# Create another tuple as family\_members and add father and mother name to it

**family\_members = siblings + ('Srinivas','Vijaya')** # Displays family\_members output **print("Family\_members:",family\_members)**

Text, application

Description automatically generated

**Description:** In the above source code we have created a tuple sisters and brothers and then created another tuple siblings and added sisters and brother tuple. Displayed by using print(). After that we created Family\_Members tuple and printed them.

Q4) Length of the set

it\_companies = {'Facebook', 'Google', 'Microsoft', 'Apple', 'IBM', 'Oracle', 'Amazon'} print("Length of it\_companies:", len(it\_companies))

#Add twitter

it\_companies.add('Twitter')

print("After adding another item:",it\_companies)

#Add multiple it\_companies **it\_companies.update({'Infosys','Capgemini','Wipro','TCS'}) print("After adding multiple items:",it\_companies)**

#Remove

it\_companies.remove('TCS')

print("After removing one company:",it\_companies)

#Discard

it\_companies.discard('TCS')

print("After discarding company:",it\_companies)

#Discard doesn't raise any error if any item is not present in the set #Join A & B

A = {19, 22, 24, 20, 25, 26}

B = {19, 22, 20, 25, 26, 24, 28, 27}

print("Join A and B:", A.union(B))

#Intersection

print("Intersection of A and B:", A.intersection(B))

#Subset

print("Subset of A and B:", A.issubset(B))

#Disjoint

print("Disjoint:", A.isdisjoint(B))

#Convert list to set

age = [22, 19, 24, 25, 26, 24, 25, 24]

print("Converting list to set:", set(age))

#Length of set

print("Length of set:",len(set(age)))

#Length of list

print("Length of list:",len(age))

#Symmetric diff- returns values which are not in common with other set print("Symmetric diff:",A.symmetric\_difference(B))

#delete set A.clear() print(A) B.clear() print(B)

Text, application

Description automatically generated

Description: Initially we assigned some values to the list. We have performed several operation like find length, adding values, remove, discard, using len(),add(),remove(),discard(). Next, we performed basic operations like union, intersection, subset, disjoint, length, symmetric difference and deletion of sets.

Q5) Calculate area of circle and circumference of circle

# Initialise r where r value can be read from user inpt

r = int(input("enter r:"))

# Calculate area of circle and circumference of circle

\_area\_of\_circle = 3.14\*r\*r

\_circum\_of\_circle = 2\*3.14\*r

# Display area of circle and circumference of circle **print("Area of Circle:",\_area\_of\_circle) print("Circumference of Circle:",\_circum\_of\_circle)**

**Graphical user interface, text, application

Description automatically generated**

Description: In the above code we have created an input variable R that takes input from the user. From the given input we calculated area of the circle, circumference of the circle using formulas(3.14\*r\*r, 2\*3.14\*r) and printed them on the screen.

Q6) Unique words using split method

# Unique

st = "I am a teacher and I love to inspire and teach people"

# Use split method to separate the words and set to get the unique values

spt=set(st.split(" ")) print(spt)

print ("Length:",len(spt))

**Text

Description automatically generated**

Description: In the above code we assigned a string "I am a teacher and I love to inspire and teach people" to st by using the split () we found the unique words in the given string and the print the unique values in the display. Now we find the length using len() and print it on the screen.

Q7) Used tab and escape to display them in the given format

**a= "Name\t Age\t Country\t City\t\nKalyan 25\t USA\t Kansas"**

**print(a)**

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Description: Escape sequence in python using strings. In Python strings, the backslash “ ” is a special character, also called the “escape” character. It is used in representing certain whitespace characters.

Q8) Use the string formatting method to display the following: #Using String format method

print(f'radius = 10') print(f'area = 3.14\*radius\*\*2')

print(f'"The area of circle with radius {r} is {3.14\*r\*r} meters square"')

**Graphical user interface, text, application

Description automatically generated**

Description: From the above code we used string formatting method to display “The area of a circle with radius 10 is 314 meters square.”. The code first prints radius = 10, then prints area = 3.14\*radius\*\*2. Now it prints the area of circle with radius 10 is 314 meters square.

Q9) Write a program, which reads weights (lbs.) of N students into a list and convert these weights to kilograms in a separate list using Loop. N: No of students (Read input from user)

#Creating a list(L1) for weights(lbs) of N students **L1=[int(num) for num in input().split(" ")]** #Creating another list called W\_kg

W\_kg=[]

#Using for loop to iterate the values and appending the list

for i in L1: W\_kg.append(round(i/2.205,2))

#Displaying the values in kgs after conversion

print ("Values are:",W\_kg)

Graphical user interface, text, application

Description automatically generated

Description: From the above code, firstly, we created a list L1 that takes input from the user and w\_kg. initializing for loop. To convert the weights, we used a formula and append() then printed the converted weights.

Q10) The diagram below shows a dataset with 2 classes and 8 data points, each with only one feature value, labeled f. Note that there are two data points with the same feature value of 6. These are shown as two x’s one above the other. Provide stepwise mathematical solution, do not write code for it.

1. Divide this data equally into two parts. Use first part as training and second part as testing. Using KNN classifier, for K=3, what would be the predicted outputs for the test samples? Show how you arrived at your answer.

2. Compute the confusion matrix for this and calculate accuracy, sensitivity and specificity values.

(Solution in the next page)

Text, letter

Description automatically generated