**ML LAB PROGRAMS:**

**1:mean,median,mode,Veriance,** **standard deviation,** **normalization,** **standardization**

**Mean:**

**Using array:**

import math

p=[115.4,78.0,123.8,34.9,127.9,567.9]

sol=sum(p)

le=len(p)

mean=sol/le

print(mean)

**Using List:**

def mean(ls):

sum=0

for i in ls:

sum=sum+i

mean=sum/len(ls)

return mean

ls=(115.4,78.0,123.8,34.9,127.9,567.9)

print("mean:",mean(ls))

**#Meadian**

**Using array:**

p=[115.4,78.0,123.8,34.9,127.9,567.9]

le=len(p)

low=0

high=le

p.sort

if(le%2==0):

mean=int((low+high)/2)

med=(p[mean]+p[mean-1])/2

else:

mean=int((low+high)/2)

med=p[mean]

print(med)

**using List:**

#median

l1=(115.4,78.0,123.8,34.9,127.9,567.9)

i=len(l1)

if(i%2==0):

res1=l1[i//2]

res2=l1[i//2-1]

res =(res1+res2)/2

else:

res=l1[i//2]

print("median:",(res))

**#Mode**

**Using array:**

from collections import Counter

num=[115.4,78.0,123.8,34.9,127.9,567.9,127.9]

no=len(num)

vl=Counter(num)

findMode=dict(vl)

mode=[i for i, v in findMode.items() if v == max(list(vl.values()))]

if len(mode)==no:

findMode= "The group of number do not have any mode"

else:

findMode= "The mode of the number are: " + ', '.join(map(str, mode))

print(findMode)

**using list:**

l1=(115.4,78.0,123.8,34.9,127.9,567.9,127.9)

d={}

for i in l1:

if i in d:

d[i]=d[i]+1

else:

d[i]=1

max=0

for i in d:

if(d[i]>max):

max=d[i]

ans=i

print("MODE:",ans)

**#variance**

**Using array:**

def variance(p):

n=len(p)

mean=sum(p)/n

deviations=[(x-mean) \*\* 2 for x in p]

variance = sum(deviations)/n

return variance

variance([115.4,78.0,123.8,34.9,127.9,567.9])

**using list:**

def var(l):

ans=mean(l)

sum=0

for i in l:

sum+=(ans-i)\*\*2

return sum/len(l)

l=(115.4,78.0,123.8,34.9,127.9,567.9)

print("variance:",var(l))

**standard deviation:**

**using array:**

def stdev(p):

var = variance(p)

std\_dev = math.sqrt(var)

return std\_dev

stdev([115.4,78.0,123.8,34.9,127.9,567.9])

**using list:**

def sd(l):

temp=var(l)

return temp\*\*0.5

l=(115.4,78.0,123.8,34.9,127.9,567.9)

print("standard deviation:",sd(l))

**Nomaralization:**

**Using array:**

def nor(ar):

a=[]

for i in range(len(ar)):

sum=(ar[i]-min(ar))/(max(ar)-min(ar))

a.append(sum)

return a

def getMode(numbers):

max\_occur=-1

if len(numbers)==0:

return None

else:

occurences={}

for i in numbers:

if occurences.get(i)==None:

occurences[i]=1

else:

occurences[i]+=1

if occurences[i]>max\_occur:

max\_occur= occurences[i]

for i in occurences:

if occurences[i]==max\_occur:

return i

return None

ar=[115.4,78.0,123.8,34.9,127.9,567.9]

print(nor(ar))

**using list:**

def nor(l):

min=l[0]

max=l[0]

for i in l:

if(i>max):

max=i

elif (i<min):

min=i

for i in l:

print((i-min)/(max-min))

l=(115.4,78.0,123.8,34.9,127.9,567.9)

nor(l)

**Standardization:**

**Using list:**

def std(l):

for i in l:

print((i-mean(l))/sd(l))

l=(115.4,78.0,123.8,34.9,127.9,567.9)

std(l)

output:







