Central Department

of

Computer Science and Information Technology

Tribhuvan University

Lab Report

on

Implementation of Fuzzy Membership Function

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CODE

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#Lab 5 Implementation of Fuzzy Membership Function
X=[30,35,40,45,50,55,60,65,70,75,80,85,90]
def belongs(X,x):   #Checking elements of x is over X or not
    if(x<=max(X) and x>=min(X)):
        return 1
    else:
        return 0

def enter():       #entering elements of x

    x=[]
    n=int(input("Enter the number of elements in set"))
    for i in range(n):
        while 1:
            element=int(input("Enter the element: "))
            if(belongs(X,element)==1):
                x.append(element)
                break;
            else:
                print("Element is out of domain it should
between",min(X),"and",max(X))
    return x

def parameters(name):   #entering parameters such as alpha beta gamma, and
checking it belongs to domain or not
    while 1:
        param=int(input("Enter the value of"+name+":"))
        if(param in X):
            return param
        else:
            print(name," doesnot belongs to Domain, Try another value")


def R(x):
    print("Implementing R function \n ----------------------------------")
    R_set={}
    while 1:
        a=parameters("Alpha")
        b=parameters("Beta")
        if(a<b):
            break;
        else:
            print("Alpha>Beta , please try another combination")

    for i in range(len(x)):
        if(x[i]<=a):
            R_set[x[i]]=0
        elif(x[i]>b):
            R_set[x[i]]=1
        else:
            R_set[x[i]]=round(float(float(x[i]-a)/float(b-a)),2)
```

```
    print("The fuzzy set using R function with alpha=",a,"beta=",b,"is:")
    print(R_set)

def L(x):
    print("Implementing L function \n ----------------------------------")
    L_set={}
    while 1:
        a=parameters("Alpha")
        b=parameters("Beta")
        if(a<b):
            break;
        else:
            print("Alpha>Beta , please try another combination")

    for i in range(len(x)):
        if(x[i]>b):
            L_set[x[i]]=0
        elif(x[i]<a):
            L_set[x[i]]=1
        else:
            L_set[x[i]]=round(float(float(x[i]-a)/float(b-a)),2)

    print("The fuzzy set using L function with alpha=",a,"beta=",b,"is:")
    print(L_set)

def T(x):
    print("Implementing Triangular function \n ------------------------------
-----")
    T_set={}
    while 1:
        a=parameters("Alpha")
        b=parameters("Beta")
        g=parameters("Gamma")
        if(a<b and b<g):
            break;
        else:
            print("The value must be like Alpha<Beta<Gamma , please try
another combination")

    for i in range(len(x)):
        if(x[i]<=a):
            T_set[x[i]]=0
        elif(a<x[i] and x[i]<=b):
            T_set[x[i]]=round(float(float(x[i]-a)/float(b-a)),2)
        elif(b<x[i] and x[i]<=g):
            T_set[x[i]]=round(float(float(g-x[i])/float(g-b)),2)
        elif(x[i]>g):
            T_set[x[i]]=1


    print("The fuzzy set using Triangular function with
alpha=",a,"beta=",b,"gamma=",g,"is:")
    print(T_set)
```

```
def TP(x):
    print("Implementing Trapezoidal function \n ----------------------------
------")
    TP_set={}
    while 1:
        a=parameters("Alpha")
        b=parameters("Beta")
        g=parameters("Gamma")
        d=parameters("Delta")
        if(a<b and b<g and g<d):
            break;
        else:
            print("The value must be like Alpha<Beta<Gamma<Delta , please try
another combination")
    for i in range(len(x)):
        if(x[i]<=a):
            TP_set[x[i]]=0
        elif(a<x[i] and x[i]<=b):
            TP_set[x[i]]=round(float(float(x[i]-a)/float(b-a)),2)
        elif(b<x[i] and x[i]<=g):
            TP_set[x[i]]=1
        elif(g<x[i] and x[i]<=d):
            TP_set[x[i]]=round(float(float(d-x[i])/float(d-g)),2)
        elif(x[i]>d):
            TP_set[x[i]]=0

    print("The fuzzy set using Trapezoidal function with
alpha=",a,"beta=",b,"gamma=",g,"delta=",d,"is:")
    print(TP_set)

x=enter()
print("THe given x:",x)
print("----------------------------------------")
R(x)
print("----------------------------------------")
L(x)
print("----------------------------------------")
T(x)
print("----------------------------------------")
TP(x)
print("----------------------------------------")
```

OUTPUT

```
Enter the number of elements in set7
Enter the element: 20
Element is out of domain it should between 30 and 90
Enter the element: 35
Enter the element: 47
Enter the element: 50
Enter the element: 60
Enter the element: 65
Enter the element: 85
Enter the element: 88
THe given x: [35, 47, 50, 60, 65, 85, 88]
----------------------------------------
Implementing R function
 ----------------------------------
Enter the value ofAlpha:50
Enter the value ofBeta:80
The fuzzy set using R function with alpha= 50 beta= 80 is:
{35: 0, 47: 0, 50: 0, 60: 0.33, 65: 0.5, 85: 1, 88: 1}
----------------------------------------
Implementing L function
 ----------------------------------
Enter the value ofAlpha:40
Enter the value ofBeta:75
The fuzzy set using L function with alpha= 40 beta= 75 is:
{35: 1, 47: 0.2, 50: 0.29, 60: 0.57, 65: 0.71, 85: 0, 88: 0}
----------------------------------------
Implementing Triangular function
 ----------------------------------
Enter the value ofAlpha:40
Enter the value ofBeta:60
Enter the value ofGamma:75
The fuzzy set using Triangular function with alpha= 40 beta= 60 gamma= 75
is:
{35: 0, 47: 0.35, 50: 0.5, 60: 1.0, 65: 0.67, 85: 1, 88: 1}
----------------------------------------
Implementing Trapezoidal function
 ----------------------------------
Enter the value ofAlpha:34
Alpha  doesnot belongs to Domain, Try another value
Enter the value ofAlpha:35
Enter the value ofBeta:50
Enter the value ofGamma:65
Enter the value ofDelta:85
The fuzzy set using Trapezoidal function with alpha= 35 beta= 50 gamma= 65
delta= 85 is:
{35: 0, 47: 0.8, 50: 1.0, 60: 1, 65: 1, 85: 0.0, 88: 0}
----------------------------------------
```