Practical 7: Decimal Scaling Method For Normalization in data mining

Normalization is the process of rescaling the data so that it has same scale.

Decimal scaling is a data normalization technique like Z score, Min-Max, and normalization with standard deviation. Decimal scaling is a data normalization technique. In this technique, we move the decimal point of values of the attribute. This movement of decimal points totally depends on the maximum value among all values in the attribute.

Decimal Scaling Formula

A value v of attribute A is can be normalized by the following formula

Normalized value of attribute = $(v_i / 10^j)$

Example of Decimal scaling

CGPA	Formula	CGPA Normalized after Decimal scaling
2	2/10	0.2
3	3/10	0.3

We will check the maximum value among our attribute CGPA. Here maximum value is 3 so we can convert it to a decimal by dividing by 10. Why 10?

we will count total numbers in our maximum value and then put 1 and after 1 we can put zeros equal to the length of the maximum value.

Here 3 is the maximum value and the total numbers in this value are only 1. so we will put one zero after one.

Salary bonus	Formula	Normalized after Decimal scaling
400	400 / 1000	0.4
310	310 / 1000	0.31

We will check the maximum value of our attribute “salary bonus“. Here maximum value is 400 so we can convert it into a decimal by dividing it by 1000. Why 1000?

400 contains three digits and we so we can put three zeros after 1. So, it looks like 1000.

Using Python:

```
# Importing libraries
import statistics
import pandas as pd

# Define function
def decNor(num,maxNum):
   digit=len(str(maxNum))
   div=pow(10,digit)
   return num/div

# Store data
data=[200, 300, 400, 600, 1000]
print(data)

# Enter an item from data
num=int(input("Enter an item from data : \t"))

# Calculating decimal scaling normalization
print("\nCalculating decimal scaling normalization")
print("After doing decimal scaling normalization : \t", decNor(num,max(data)))
```