

Problem Statement

Given a sequence of n values x_1, x_2, \dots, x_n and a window size $k > 0$, the k -th moving average of the given sequence is defined as follows:

The moving average sequence has $n-k+1$ elements as shown below.

The moving averages with $k=4$ of a ten-value sequence ($n=10$) is shown below

i 1 2 3 4 5 6 7 8 9 10

=====

Input 10 20 30 40 50 60 70 80 90 100

$y_1 \ 25 = (10+20+30+40)/4$

$y_2 \ 35 = (20+30+40+50)/4$

$y_3 \ 45 = (30+40+50+60)/4$

$y_4 \ 55 = (40+50+60+70)/4$

$y_5 \ 65 = (50+60+70+80)/4$

$y_6 \ 75 = (60+70+80+90)/4$

$y_7 \ 85 = (70+80+90+100)/4$

Thus, the moving average sequence has $n-k+1=10-4+1=7$ values.

Problem Statement:

Write a function to find moving average in an array over a window:

Test it over [3, 5, 7, 2, 8, 10, 11, 65, 72, 81, 99, 100, 150] and window of 3.

Solution:

Source Code

$x = [3, 5, 7, 2, 8, 10, 11, 65, 72, 81, 99, 100, 150]$

```

moving_seq = 3
cumulative_sum , moving_average = [0],[]

def Moving_Average_function(x, moving_sequence):
    N = moving_seq
    for i , j in enumerate(x,1):
        cumulative_sum.append(cumulative_sum[i-1] + j)

    if i>=N:
        moving_ave = round((cumulative_sum[i] - cumulative_sum[i-N])/N,2)
        moving_average.append(moving_ave)
    return (moving_average), len(moving_average)

Result_fun = Moving_average_fun(x,moving_seq)

print (" The user defined list is :-\n { } \n The user defined window size is :-\t { }
".format(x,mov_seq))

print ("-"*60)

print ("-"*60)

print (" The result output using the defined function above is as follows:\t")

print (" Moving Average values :-\n",Result_fun[0])

print (" The moving average sequence has :- { }, values".format(Result_fun[1]))

```

Output Screenshot:

```
In [25]: x = [3,5,7,2,8,10,11,65,72,81,99,100,150]
```

```
moving_seq = 3
cumulative_sum , moving_average = [0],[ ]

def Moving_Average_function(x, moving_sequence):
    N = moving_seq
    for i , j in enumerate(x,1):
        cumulative_sum.append(cumulative_sum[i-1] + j)

        if i>=N: |
            moving_ave = round((cumulative_sum[i] - cumulative_sum[i-N])/N,2)
            moving_average.append(moving_ave)
    return (moving_average), len(moving_average)

Result_fun = Moving_average_fun(x,moving_seq)

print (" The user defined list is :-\n {} \n The user defined window size is :-\t {} ".format(x,mov_seq))
print ("-"*60)
print ("-"*60)
print (" The result output using the defined function above is as follows:\t")
print (" Moving Average values :-\n",Result_fun[0])
print (" The moving average sequence has :- {}, values".format(Result_fun[1]))
```

The user defined list is :-

[3, 5, 7, 2, 8, 10, 11, 65, 72, 81, 99, 100, 150]

The user defined window size is :- 3

The result output using the defined function above is as follows:

Moving Average values :-

[5.0, 4.67, 5.67, 6.67, 9.67, 28.67, 49.33, 72.67, 84.0, 93.33, 116.33]

The moving average sequence has :- 11, values