A PYTHON PROGRAM TO IMPLEMENT SINGLE LAYER PERCEPTRON

Expt no. 4

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PROGRAM:

```
import numpy as np
import pandas as pd

input_value = np.array([[0,0], [0,1], [1,1], [1,0]])
print(input_value.shape)

output = np.array([0,0,1,0])
output = output.reshape(4,1)
print(output.shape)

weights = np.array([[0.1],[0.3]])
bias = 0.2

def sigmoid_func(x):
    return 1/(1+np.exp(-x))

def der(x): return sigmoid_func(x)*(1 -

sigmoid_func(x)) for epochs in range(15000):


    input_arr = input_value
    weighted_sum = np.dot(input_arr, weights) + bias
    first_output = sigmoid_func(weighted_sum)
    error = first_output - output
    total_error = np.square(np.subtract(first_output, output)).mean()
    first_der = error
    second_der = der(first_output)
    derivative = first_der * second_der
    t_input = input_value.T
    final_derivative = np.dot(t_input, derivative)
    weights = weights - (0.05 * final_derivative)
    for i in derivative:
        bias = bias - (0.05 * i)

print(weights)
print(bias)


pred = np.array([1,0])
result = np.dot(pred, weights) + bias
res = sigmoid_func(result)
print(res)


pred = np.array([1,1])
result = np.dot(pred, weights) + bias
res = sigmoid_func(result)
print(res)


pred = np.array([0,0])
result = np.dot(pred, weights) + bias
res = sigmoid_func(result)
print(res)
```

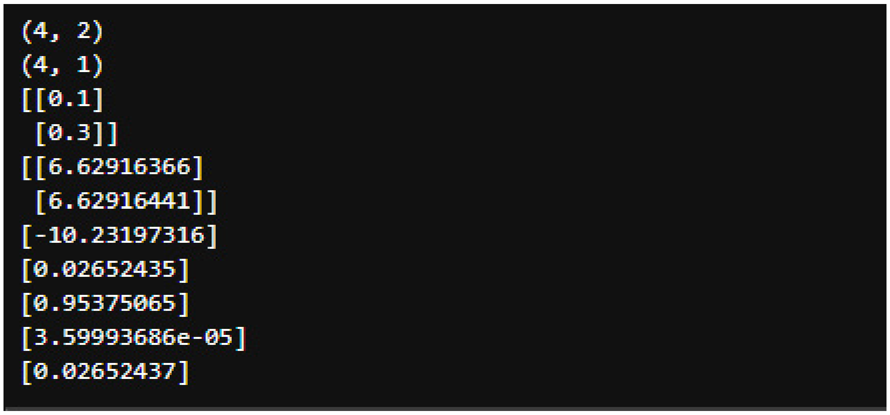
```
pred = np.array([0,1])

result = np.dot(pred, weights) + bias

res = sigmoid_func(result)

print(res)
```

OUTPUT:



```
(4, 2)
(4, 1)
[[0.1]
 [0.3]]
[[6.62916366]
 [6.62916441]]
[-10.23197316]
[0.02652435]
[0.95375065]
[3.59993686e-05]
[0.02652437]
```