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CPE32S8

Creating class for neuron which consists of computation for the weighted sum of inputs and ReLU activation function:

In [ ]:
```
class Neuron:
    def __init__(self, input_list, weight_list):
        self.input_list = input_list
        self.weight_list = weight_list

    # A function for computing weighted sum of the inputs
    def sum(self):
        total = 0
        for input_value, weight_value in zip(self.input_list, self.weight_list):
            total += input_value * weight_value
        return total

    # Activation function (ReLU)
    def rectified(output):
         if output > 0:
          return output
         else:
          return 0
```

In [ ]:
```
input_list = [5, 7, 2, 6, 7]  # 5 inputs
weight_list = [0.1, 0.2, 0.3, 0.5, 0.6] # 5 weights

result = Neuron(input_list, weight_list)
add_unit = result.sum() # computing their add unit
print("Inputs: ", input_list) # printing the inputs
print("Weights: ", weight_list) # printing the weights
print("Add Unit: ", add_unit) # printing the add unit
with_act_function = Neuron.rectified(add_unit) # applying the ReLU activation function
print("With ReLU Activation: ", with_act_function)  # printing the value when ReLU activation is applied
```

```
Inputs:  [5, 7, 2, 6, 7]
Weights:  [0.1, 0.2, 0.3, 0.5, 0.6]
Add Unit:  9.7
With ReLU Activation:  9.7
```

The Rectified Linear Unit (ReLU) outputs x if it is positive. However, if it is negative or 0, the function outputs 0.

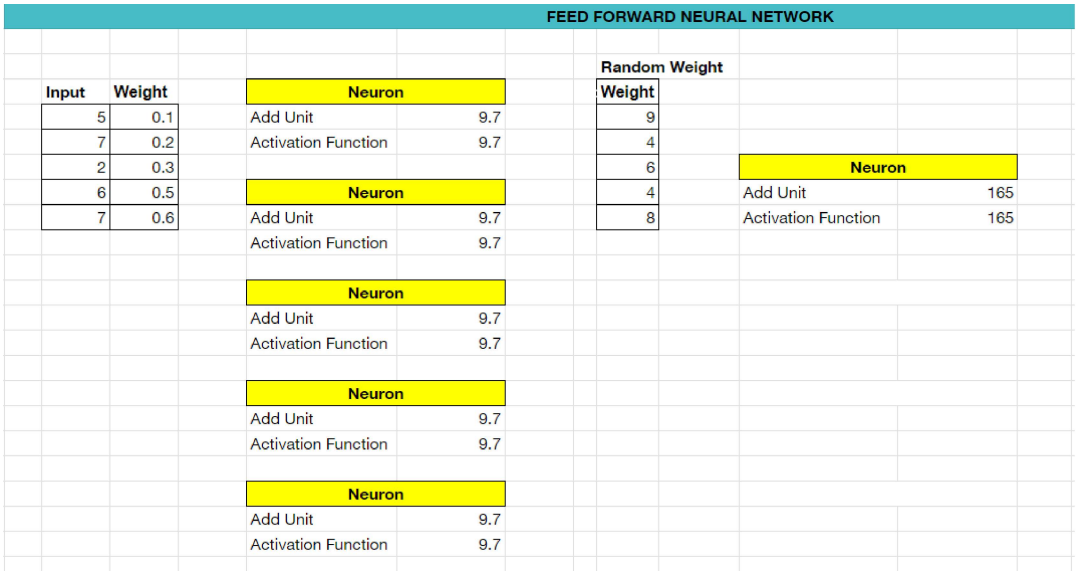
In [ ]:
```
from random import randint

weight_list_2 = []  # random weights
n=5

for i in range(n):
        weight_list_2.append(randint(1,10))

result = Neuron(input_list, weight_list_2) # updating the weight list
add_unit = result.sum()  # computing the add unit with new random weights
print("Random Weights: ", weight_list_2) # printing the weights
print("Add Unit: ", add_unit) # printing the add unit
with_act_function = Neuron.rectified(add_unit) # applying the ReLU activation function
print("With ReLU Activation: ", with_act_function) # printing the value when ReLU activation is applied
```

```
Random Weights:  [9, 4, 6, 4, 8]
Add Unit:  165
With ReLU Activation:  165
```



FEED FORWARD NEURAL NETWORK								
					Random Weight			
Input	Weight		Neuron		Weight			
5	0.1		Add Unit	9.7	9			
7	0.2		Activation Function	9.7	4			
2	0.3				6		Neuron	
6	0.5		Neuron		4		Add Unit	165
7	0.6		Add Unit	9.7	8		Activation Function	165
			Activation Function	9.7				
			Neuron					
			Add Unit	9.7				
			Activation Function	9.7				
			Neuron					
			Add Unit	9.7				
			Activation Function	9.7				
			Neuron					
			Add Unit	9.7				
			Activation Function	9.7				

To check if the outputs are correct, I manually computed it using the excel. It shows similar result which means that code for feed forward neural network successfully computed the add unit with an activation function.

Google colab link: https://colab.research.google.com/drive/1x4aQL1BwjzT-bX5Mqaf8uonIcGInHntS?usp=sharing