Playground

February 16, 2024

```python
import numpy as np
import matplotlib.pyplot as plt
```

1 mcculloch_pitts_neuron

```python
def mcculloch_pitts_neuron(inputs, weights, threshold):
    inputs = np.array(inputs)
    weights = np.array(weights)

    weighted_sum = sum(inputs * weights)
    return 1 if weighted_sum >= threshold else 0
```

2 AND

```python
weights = [1, 1]
threshold = 2
print(mcculloch_pitts_neuron(inputs=[1, 1],
        weights=weights, threshold=threshold))
print(mcculloch_pitts_neuron(inputs=[1, 0],
        weights=weights, threshold=threshold))
print(mcculloch_pitts_neuron(inputs=[0, 1],
        weights=weights, threshold=threshold))
print(mcculloch_pitts_neuron(inputs=[0, 0],
        weights=weights, threshold=threshold))
```

```
1
0
0
0
```

3 OR

```python
weights = [1, 1]
threshold = 1
print(mcculloch_pitts_neuron(inputs=[1, 1],
        weights=weights, threshold=threshold))
```

```python
print(mcculloch_pitts_neuron(inputs=[1, 0],
      weights=weights, threshold=threshold))
print(mcculloch_pitts_neuron(inputs=[0, 1],
      weights=weights, threshold=threshold))
print(mcculloch_pitts_neuron(inputs=[0, 0],
      weights=weights, threshold=threshold))
```

```
1
1
1
0
```

4 NOT

```python
weights = [-1]
threshold = 0
print(mcculloch_pitts_neuron(inputs=[1], weights=weights, threshold=threshold))
print(mcculloch_pitts_neuron(inputs=[0], weights=weights, threshold=threshold))
```

```
0
1
```

```
1
```

5 NAND

```python
weights = [-1, -1]
threshold = -1
print(mcculloch_pitts_neuron(inputs=[1, 1],
      weights=weights, threshold=threshold))
print(mcculloch_pitts_neuron(inputs=[1, 0],
      weights=weights, threshold=threshold))
print(mcculloch_pitts_neuron(inputs=[0, 1],
      weights=weights, threshold=threshold))
print(mcculloch_pitts_neuron(inputs=[0, 0],
      weights=weights, threshold=threshold))
```

```
0
1
1
1
```

6 NOR

```python
weights = [-1, -1]
threshold = 0
print(mcculloch_pitts_neuron(inputs=[1, 1],
        weights=weights, threshold=threshold))
print(mcculloch_pitts_neuron(inputs=[1, 0],
        weights=weights, threshold=threshold))
print(mcculloch_pitts_neuron(inputs=[0, 1],
        weights=weights, threshold=threshold))
print(mcculloch_pitts_neuron(inputs=[0, 0],
        weights=weights, threshold=threshold))
```

```
0
0
0
1

0
0
1
```