

```
In [ ]: import numpy as np
import pandas as pd
```

## Quantization

```
In [ ]: def quantize(min, max, L=None, Nb=None):
    if L == None and Nb != None:
        L = int(np.power(2, Nb))
    elif L != None and Nb == None:
        Nb = int(np.ceil(np.log2(L)))
    delta = (max - min) / L

    # [ [index, start_range, end_range, real_value, code] ]
    table = []
    for i in range(L):
        start_range = min + (i * delta)
        end_range = start_range + delta
        real_value = (start_range + end_range) / 2
        code = np.binary_repr(i, Nb)
        table.append([i, start_range, end_range, real_value, code])
    return table
```

```
In [ ]: data = quantize(min=200, max=1800, Nb= 4)
columns = ['index', 'start_range', 'end_range', 'real_value', 'code']
pd.DataFrame(data, columns=columns)
```

Out[ ]:

	index	start_range	end_range	real_value	code
<b>0</b>	0	200.0	300.0	250.0	0000
<b>1</b>	1	300.0	400.0	350.0	0001
<b>2</b>	2	400.0	500.0	450.0	0010
<b>3</b>	3	500.0	600.0	550.0	0011
<b>4</b>	4	600.0	700.0	650.0	0100
<b>5</b>	5	700.0	800.0	750.0	0101
<b>6</b>	6	800.0	900.0	850.0	0110
<b>7</b>	7	900.0	1000.0	950.0	0111
<b>8</b>	8	1000.0	1100.0	1050.0	1000
<b>9</b>	9	1100.0	1200.0	1150.0	1001
<b>10</b>	10	1200.0	1300.0	1250.0	1010
<b>11</b>	11	1300.0	1400.0	1350.0	1011
<b>12</b>	12	1400.0	1500.0	1450.0	1100
<b>13</b>	13	1500.0	1600.0	1550.0	1101
<b>14</b>	14	1600.0	1700.0	1650.0	1110
<b>15</b>	15	1700.0	1800.0	1750.0	1111