# Limitations



# TEXT TO MORSE CODE: "SOS SOS SOS" => "... --- ... / ... --- ... / ... --- ..."

Chart, histogram

Description automatically generated



**Test 1: Setting: dark and far, threshold is 140**

**Result:** Our code returns empty. Why did this happen?

Checkpoint 2: a labeled list of signal lengths is [7, -7, 7, -5, 5, -13, 7, -5, 12, -26, 8, -4, 8, -8, 5, -27, 9, -4, 8, -8, 5, -13, 8, -5, 10, -2, 6, -20, 7, -7, 7, -4, 6, -27, 9, -4, 7, -9, 5, -13, 7, -5, 11, -2, 6, -20, 7, -5] [4 3 4 3 4 2 4 3 4 0 4 3 4 3 4 0 4 3 4 3 4 2 4 3 4 3 4 1 4 3 4 3 4 0 4 3 4

2 4 2 4 3 4 3 4 1 4 3]

Not a real letter :(

Not a real letter :(

Not a real letter :(

Not a real letter :(

Not a real letter :(

Checkpoint 3: The plaintext is

Student answer is “”. Correct answer is “SOS SOS SOS”.

**Test 2: Same setting but threshold is 100.**

Our code returns “SAS SWS SW”. This result is quite an improvement from the case where the threshold is 140.

**Result:**

Checkpoint 2: a labeled list of signal lengths is [7, -6, 8, -4, 6, -13, 7, -5, 18, -19, 9, -4, 8, -8, 5, -27, 9, -4, 8, -8, 5, -13, 8, -5, 10, -2, 11, -15, 7, -7, 7, -4, 6, -27, 9, -4, 8, -8, 5, -13, 7, -5, 11, -2, 11, -15, 7, -5] [3 2 3 2 3 1 3 2 4 1 3 2 3 2 3 0 3 2 3 2 3 1 3 2 4 2 4 1 3 2 3 2 3 0 3 2 3

2 3 1 3 2 4 2 4 1 3 2]

Checkpoint 3: The plaintext is “SAS SWS SW”.

Student answer is SAS SWS SW. Correct answer is “SOS SOS SOS”.

**Test 3: Same setting but threshold is 50.**

**Result:** Our code return “SAS SSS SS”. However, this result is not an improvement from the case where the threshold is 100.

Checkpoint 2: a labeled list of signal lengths is [7, -6, 8, -4, 6, -13, 8, -4, 18, -19, 9, -4, 8, -8, 5, -27, 9, -4, 8, -8, 5, -13, 8, -5, 10, -2, 11, -15, 7, -7, 7, -4, 6, -27, 9, -4, 8, -8, 5, -13, 8, -4, 11, -2, 11, -15, 7, -5] [3 2 3 2 3 1 3 2 4 1 3 2 3 2 3 0 3 2 3 2 3 1 3 2 3 2 3 1 3 2 3 2 3 0 3 2 3

2 3 1 3 2 3 2 3 1 3 2]

Checkpoint 3: The plaintext is “SAS SSS SS”.

Student answer is SAS SSS SS. Correct answer is “SOS SOS SOS”.

What are the drawbacks of K-Means clustering suggest any two modifications for overcoming these drawbacks?

* It requires to specify the number of clusters (k) in advance. It can not handle noisy data and outliers.
* K-means can be quite sensitive to outliers. Remove the outliers first or use an algorithm that is more robust to noise. For example, k medians is more robust and very similar to k-means.
* Find a better way to distinguish dot from dash signals.
* Frequency of dot signals that correctly labeled and incorrectly labeled
* All S signals vs all O signals
* Brightness for dot signals, cluster 3, and for dash signals, cluster 4

Our conclusion was the morse code generator is buggy. It does not create the last light frame in sos.