
Algorithm 1 K-Means

```
1: function K-MEANS( $k, dataset, distance\_method, tolerance, max\_iterations$ )
2:    $centroid \leftarrow \text{Initialize\_centroids}(k)$ 
3:    $changed \leftarrow \text{True}$ 
4:    $iteration \leftarrow 0$ 
5:   while  $changed$  do
6:      $iteration \leftarrow iteration + 1$ 
7:      $classification \leftarrow \text{classifies\_points}(dataset, distance\_method)$ 
8:      $previous \leftarrow \text{copy}(centroids)$ 
9:      $centroids \leftarrow \text{update\_centroids}(centroids, classification)$ 
10:    if  $iteration = max\_iterations$  then
11:       $changed \leftarrow \text{False}$ 
12:    else if  $centroids = previous$  then
13:       $changed \leftarrow \text{False}$ 
14:    else if  $\text{stop\_threshold}(centroids, previous, tolerance)$  then
15:       $changed \leftarrow \text{False}$ 
16:    end if
17:  end while
18:  Return  $centroids, classification$ 
19: end function
```

Algorithm 2 K-NearestNeighbor

```
1: function KNN( $k, distance\_method, training, test$ )
2:   for all  $i \in \text{Dot}(test)$  do
3:     for all  $j \in \text{Dot}(training)$  do
4:        $distance_j \leftarrow \text{distance}(i, j, distanceMethod)$ 
5:     end for
6:      $neighbors \leftarrow \text{sorted}(distances)$ 
7:      $k\_neighbors \leftarrow \text{first}(k, neighbors)$ 
8:      $results_i \leftarrow \text{classify}(i, k\_neighbors)$ 
9:   end for
10:   $accuracy \leftarrow \text{accuracy}(results, test)$ 
11:  Return  $accuracy, results;$ 
12: end function
```
