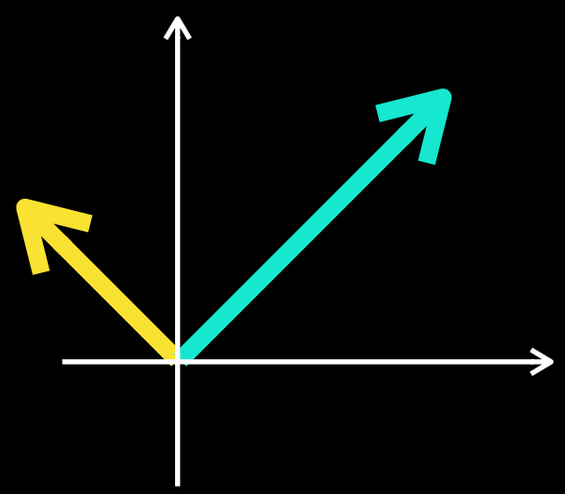
K-Means

Linear Algebra Essentials

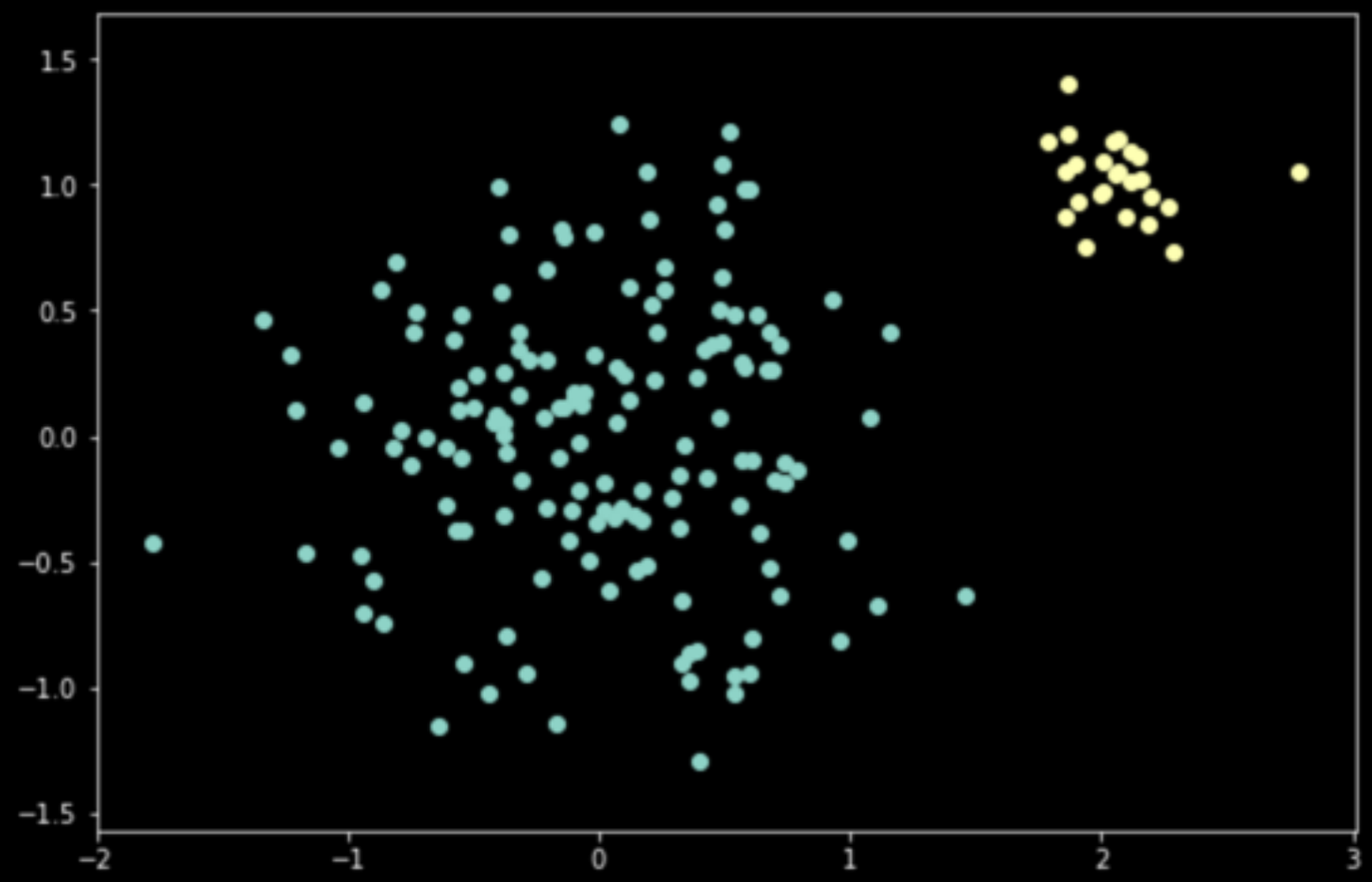


```
1 data_1 = np.random.normal((0,0), 0.6, size=(150, 2))
2 data_1[:5]
```

```
array([[ 0.11552015,  0.14382998],
       [-0.384048  ,  0.25540609],
       [-0.07450555,  0.12792034],
       [ 0.06392097, -0.32021936],
       [ 0.39149364,  0.23741043]])
```

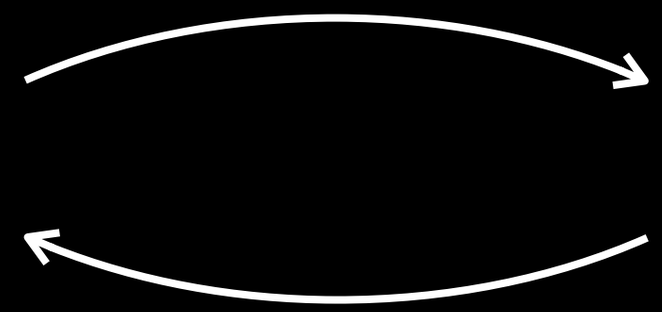
```
1 data_2 = np.random.normal((2,1), 0.2, size=(25, 2))
2 data_2[:5]
```

```
array([[1.93660937, 0.75485272],
       [2.05340567, 1.04369055],
       [2.09710467, 0.87769884],
       [2.11849749, 1.01159442],
       [2.18978382, 0.95007782]])
```

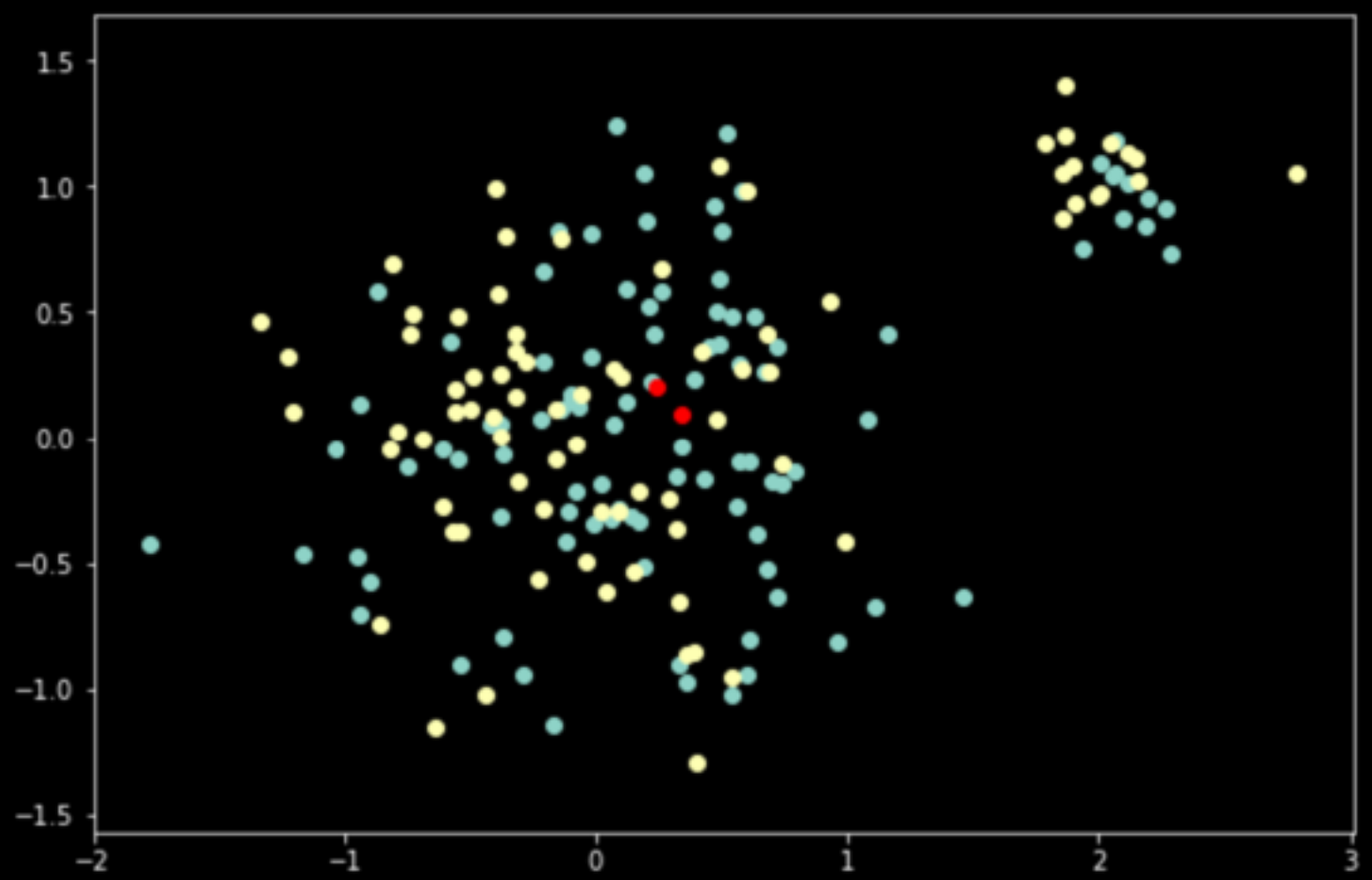


Algorithm

Update centers of the clusters



Update vectors' membership in the clusters

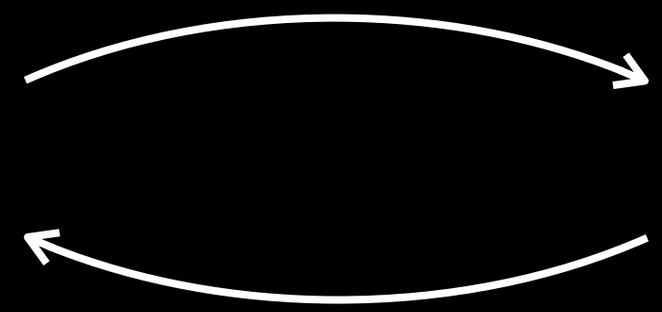


Update Means

$$C_k = \frac{1}{n_k} \sum_{i}^{n_k} v_i, \; if \; v_i \in \; class \; k$$

Algorithm

Update centers of the clusters



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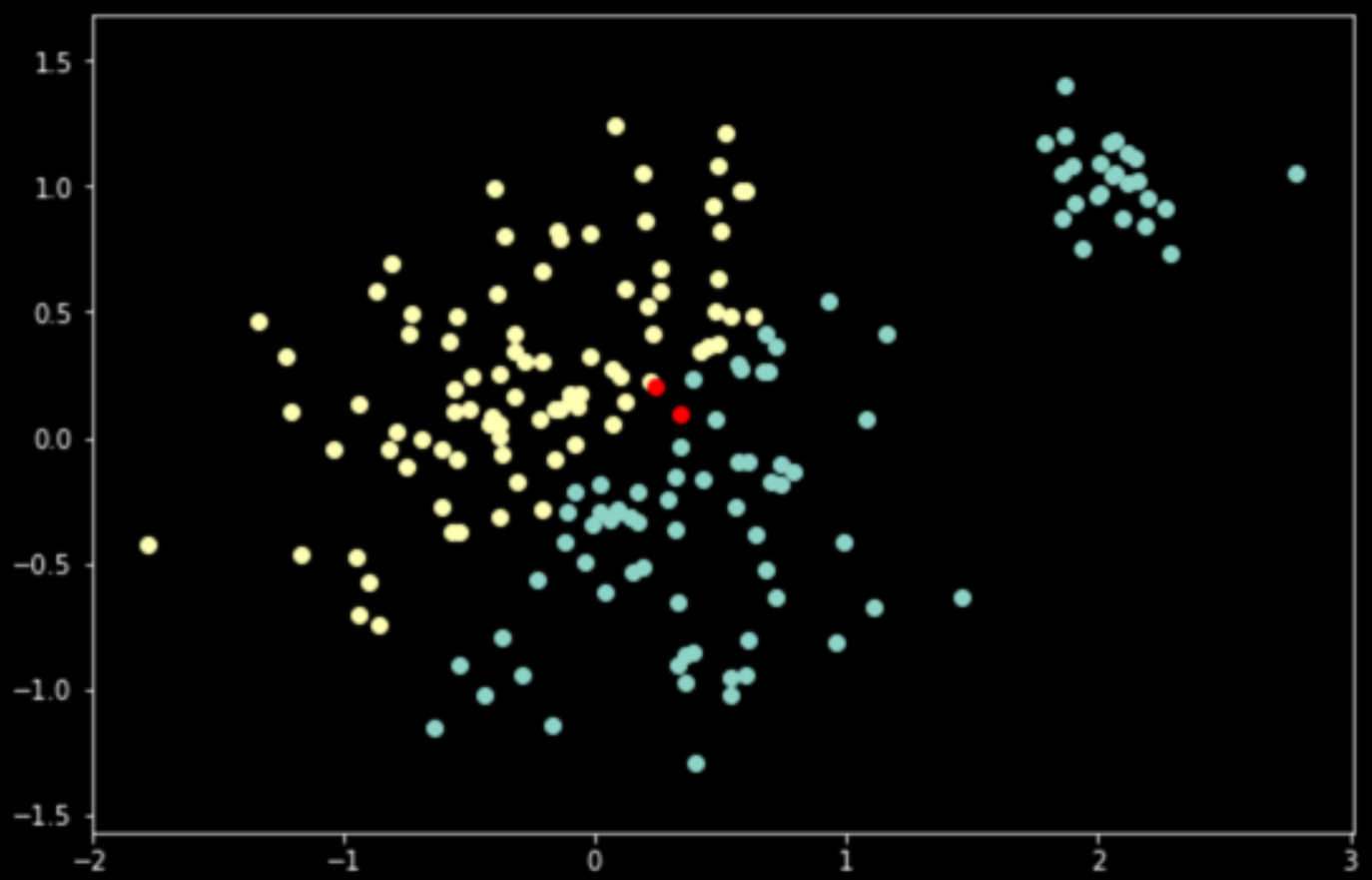

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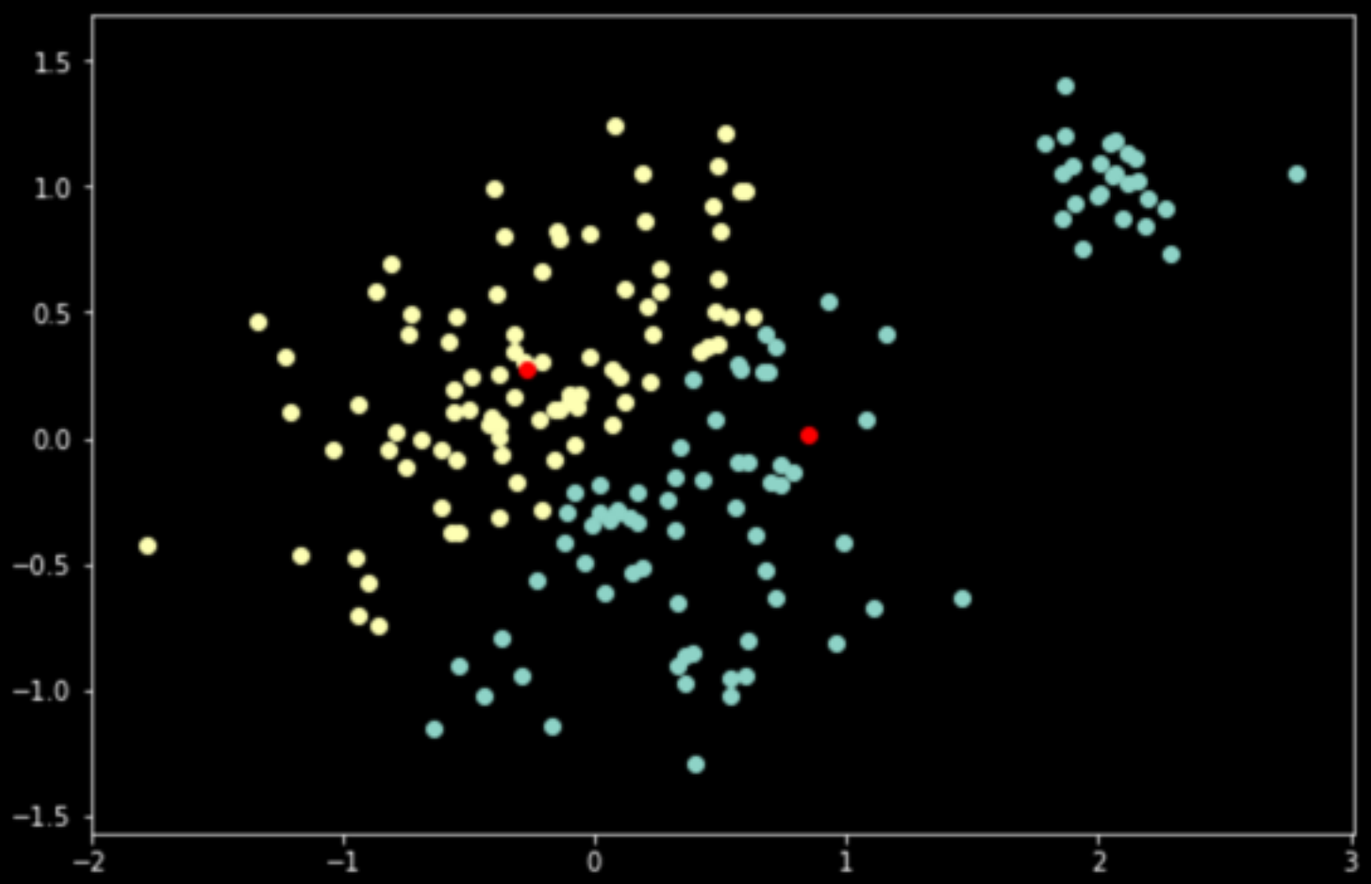

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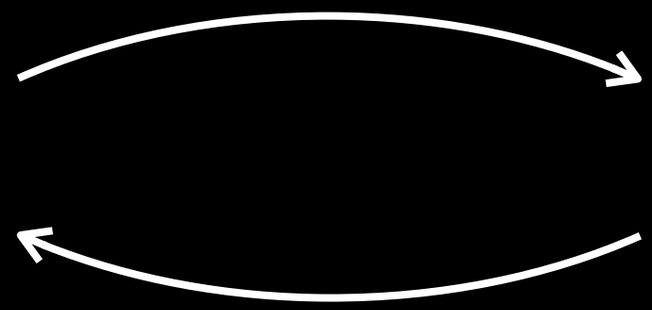

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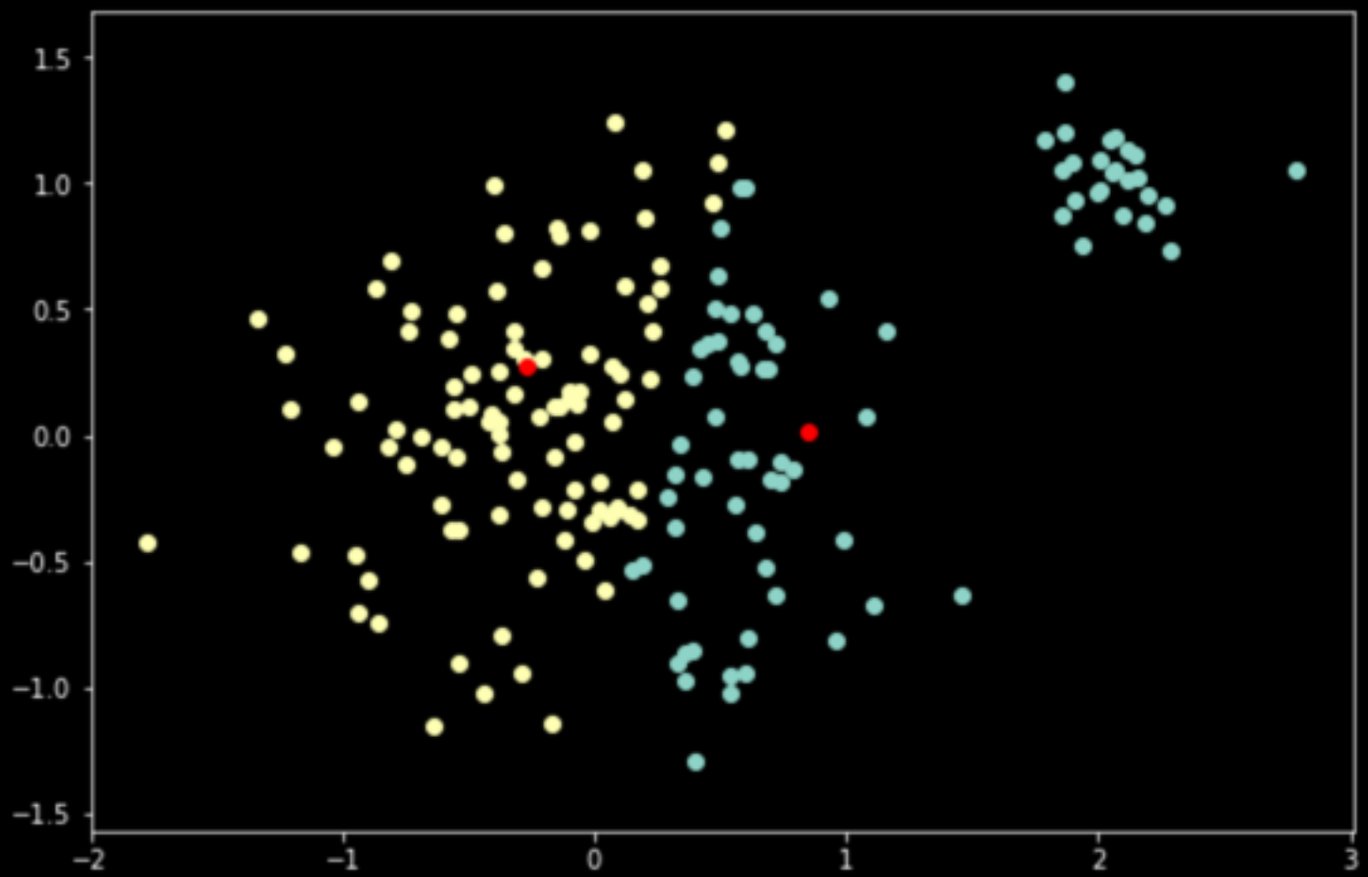

Algorithm

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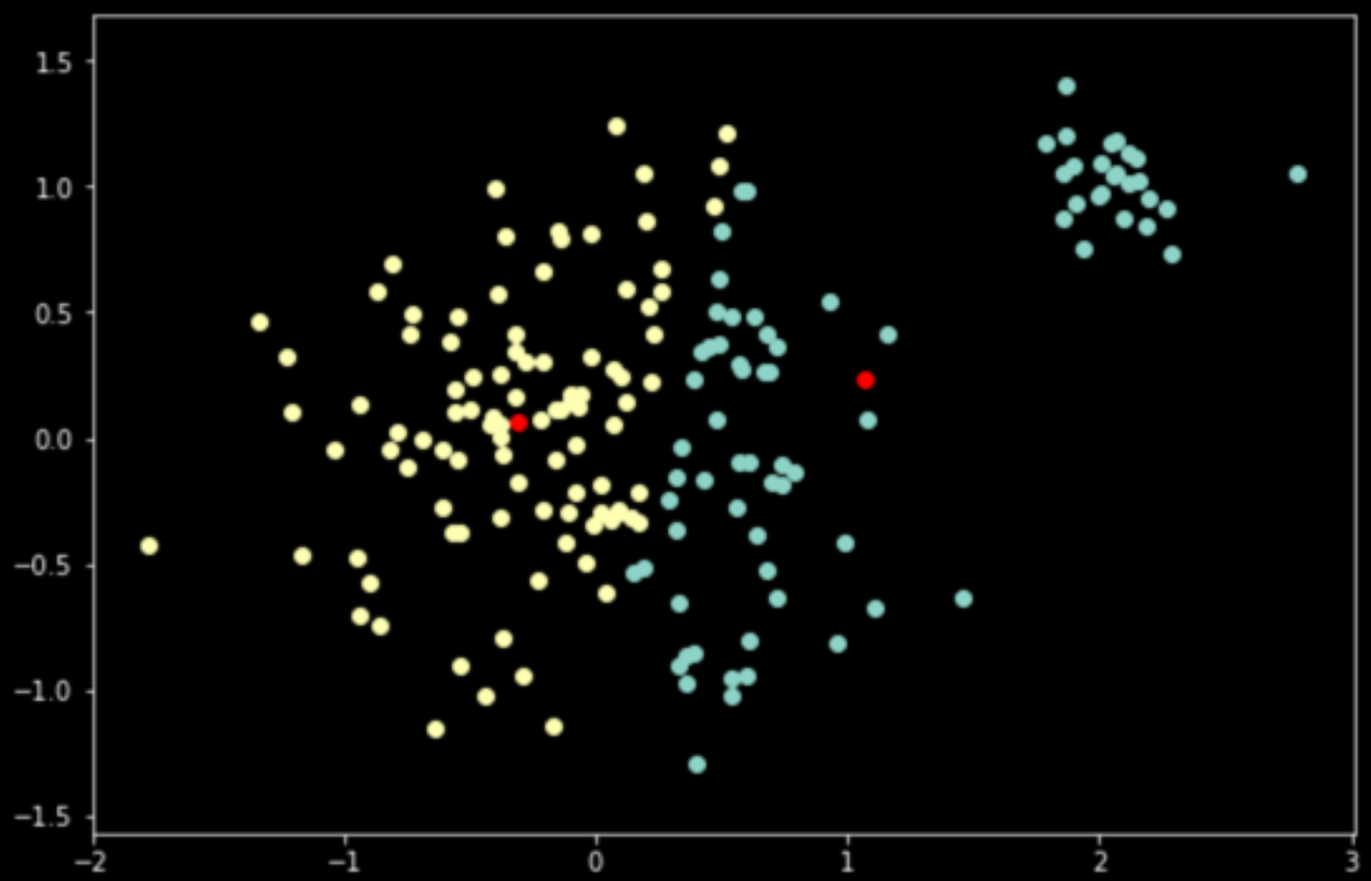

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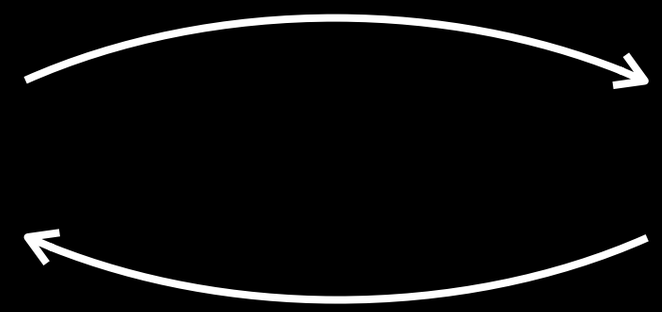

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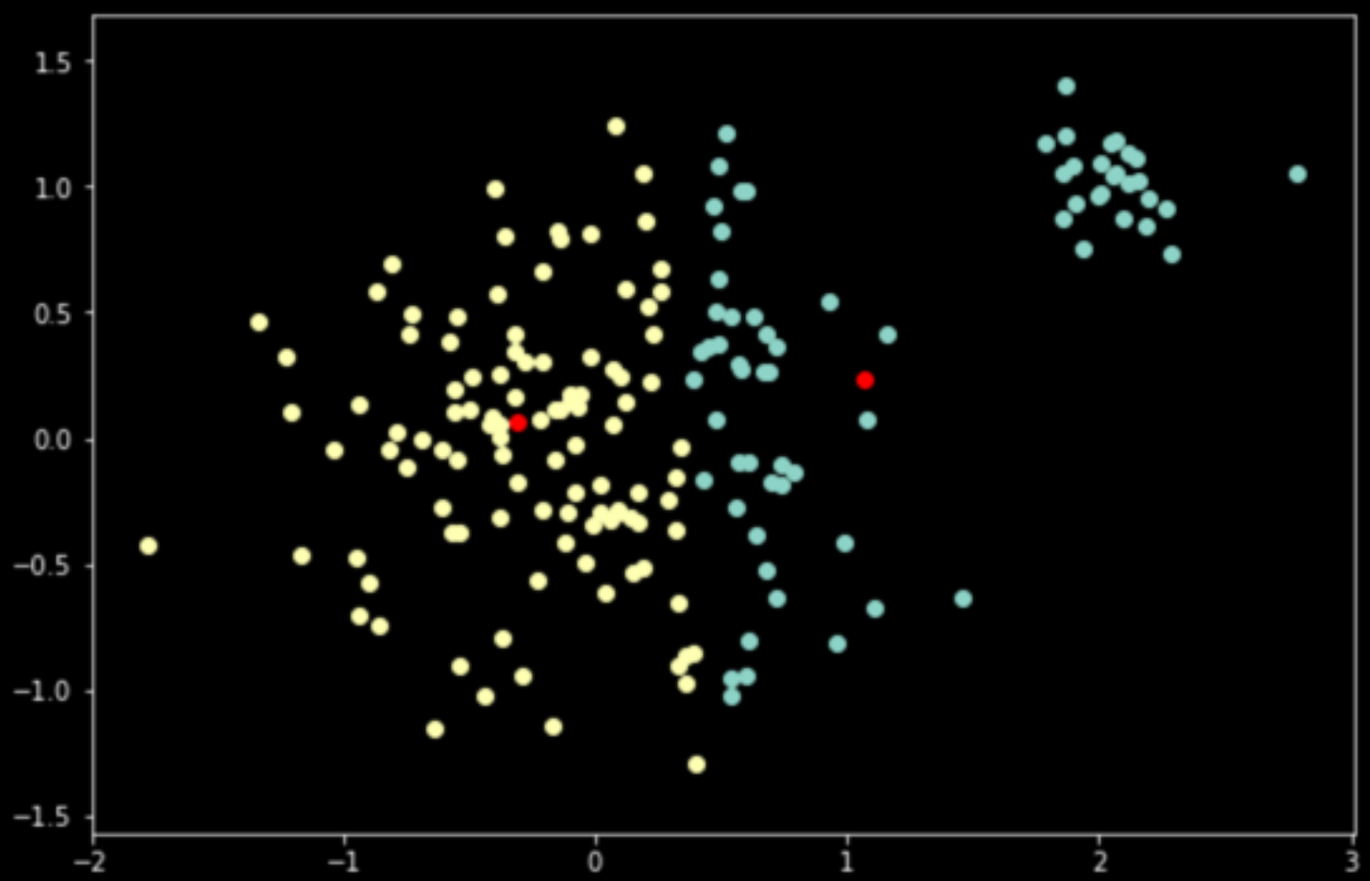

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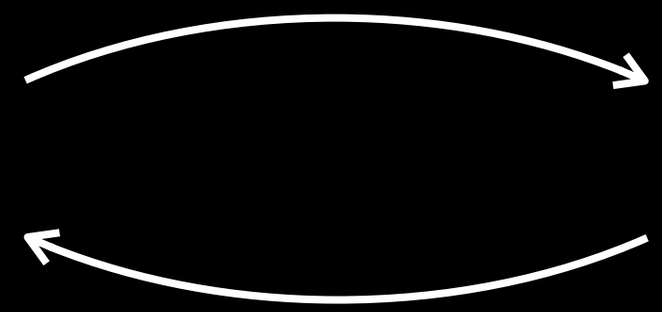

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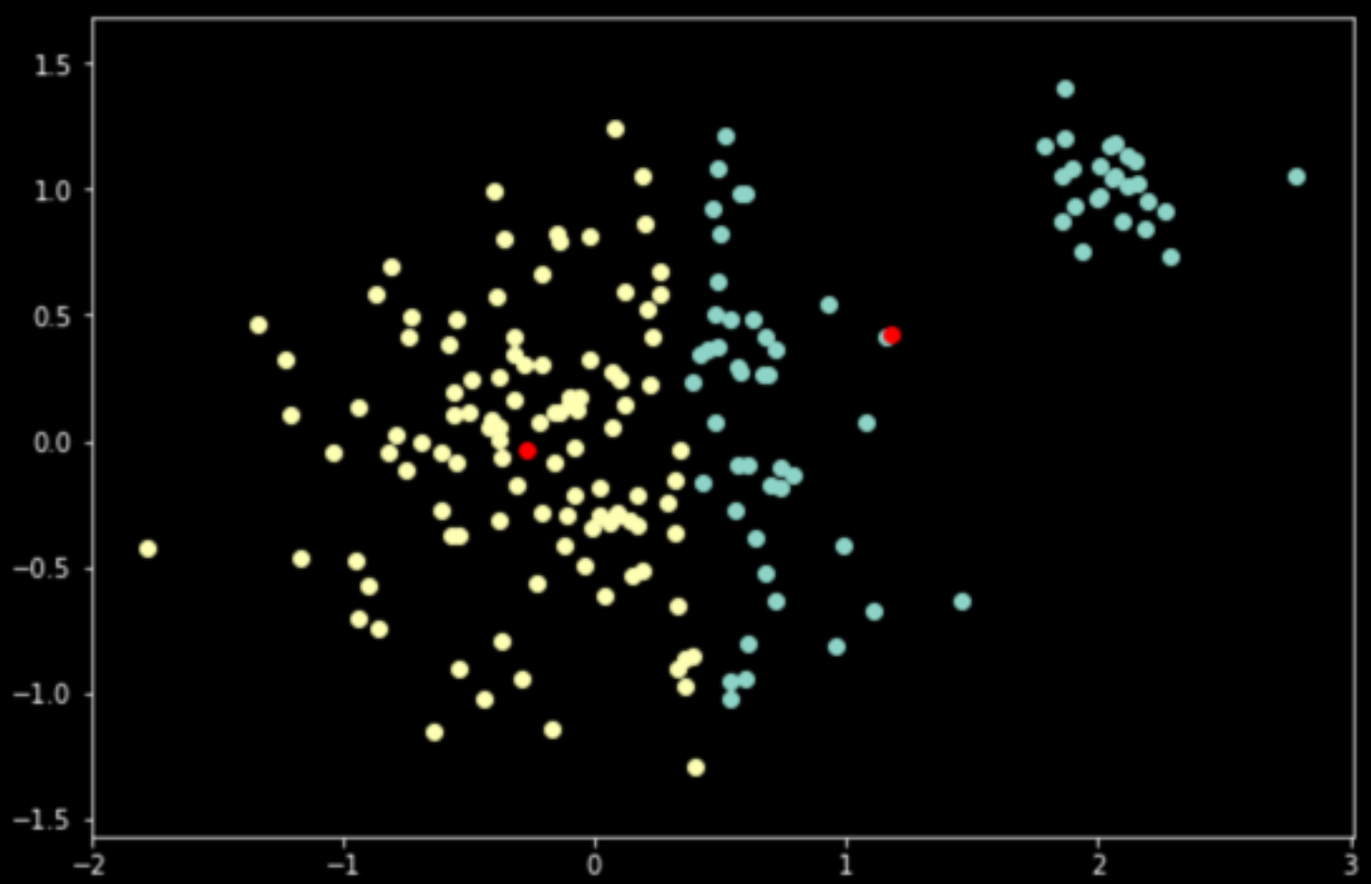

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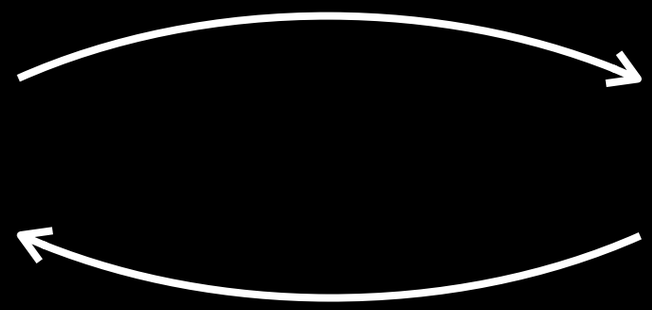

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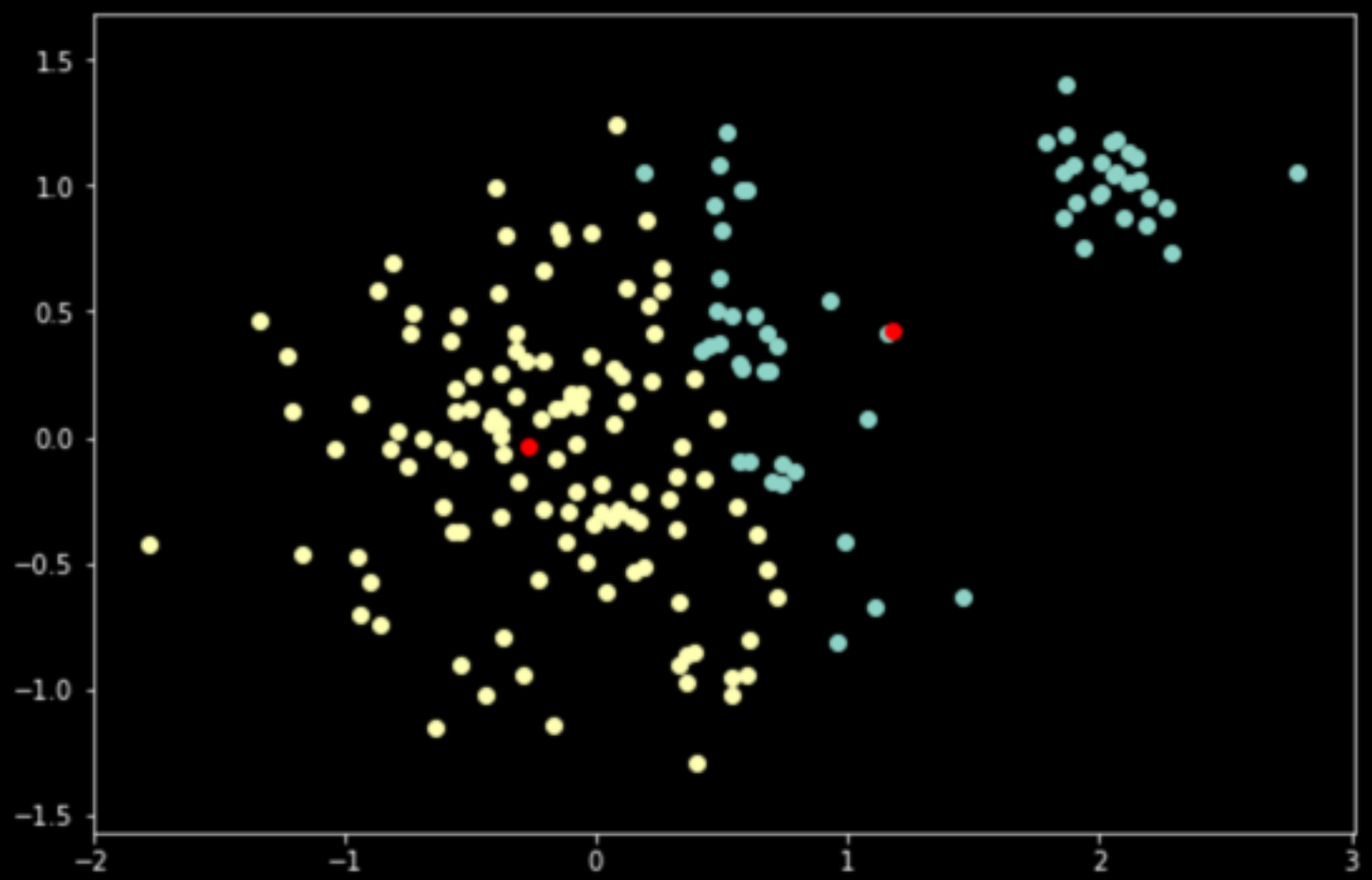

Algorithm

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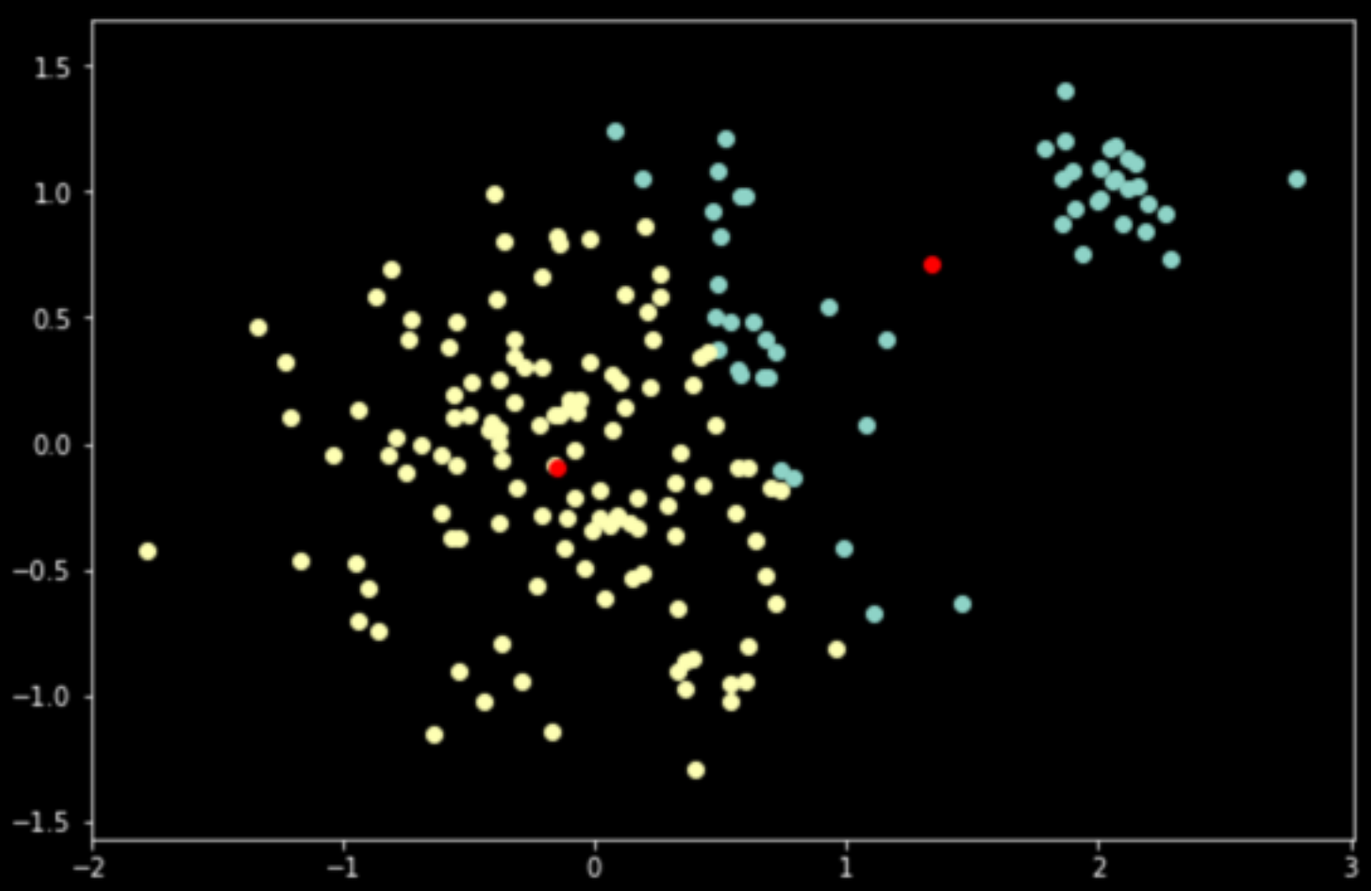
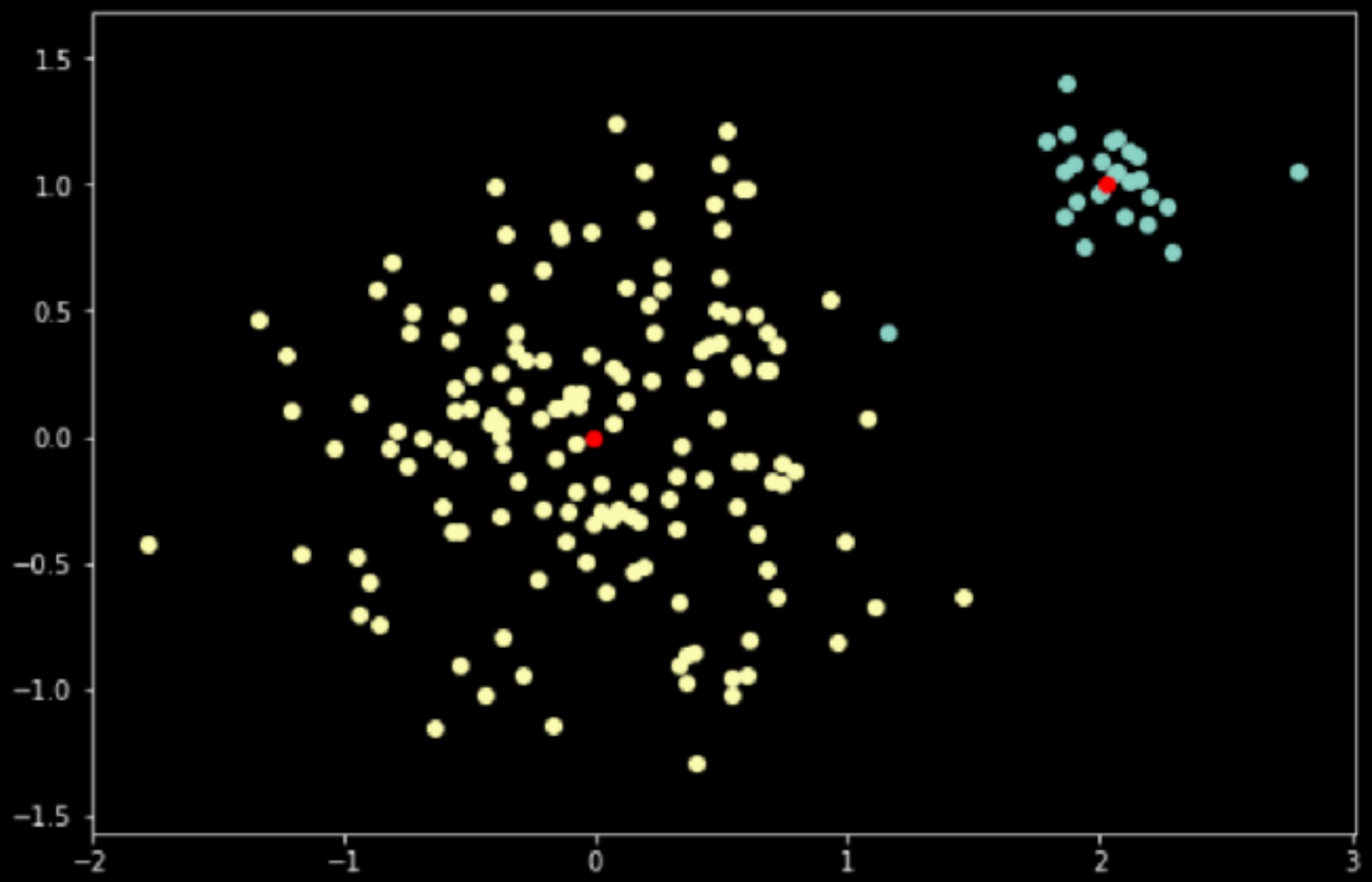


Algorithm converges



Algorithm converges