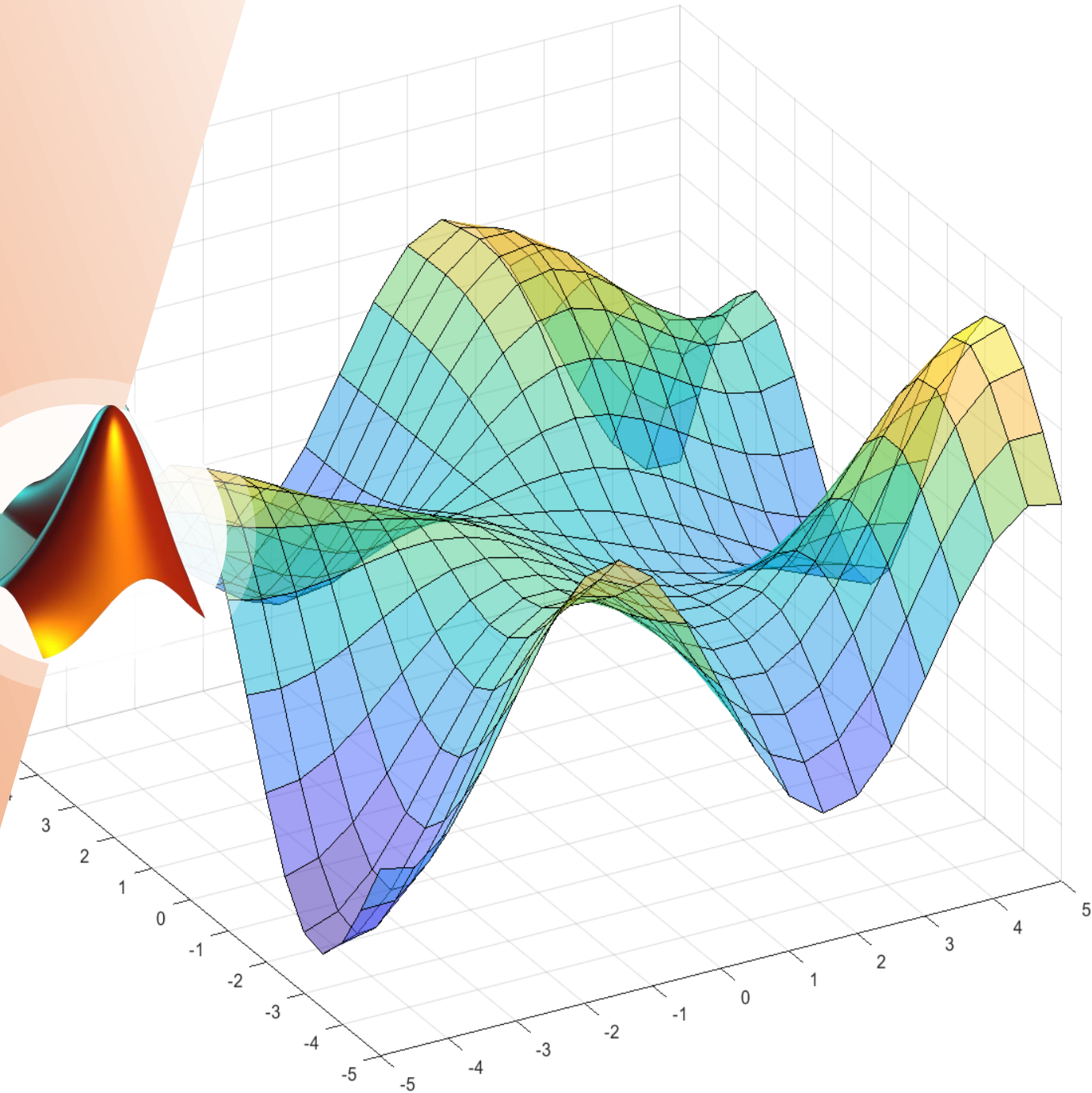
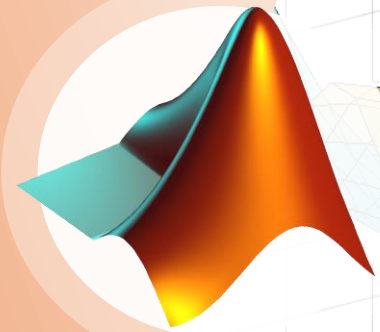


MATLAB

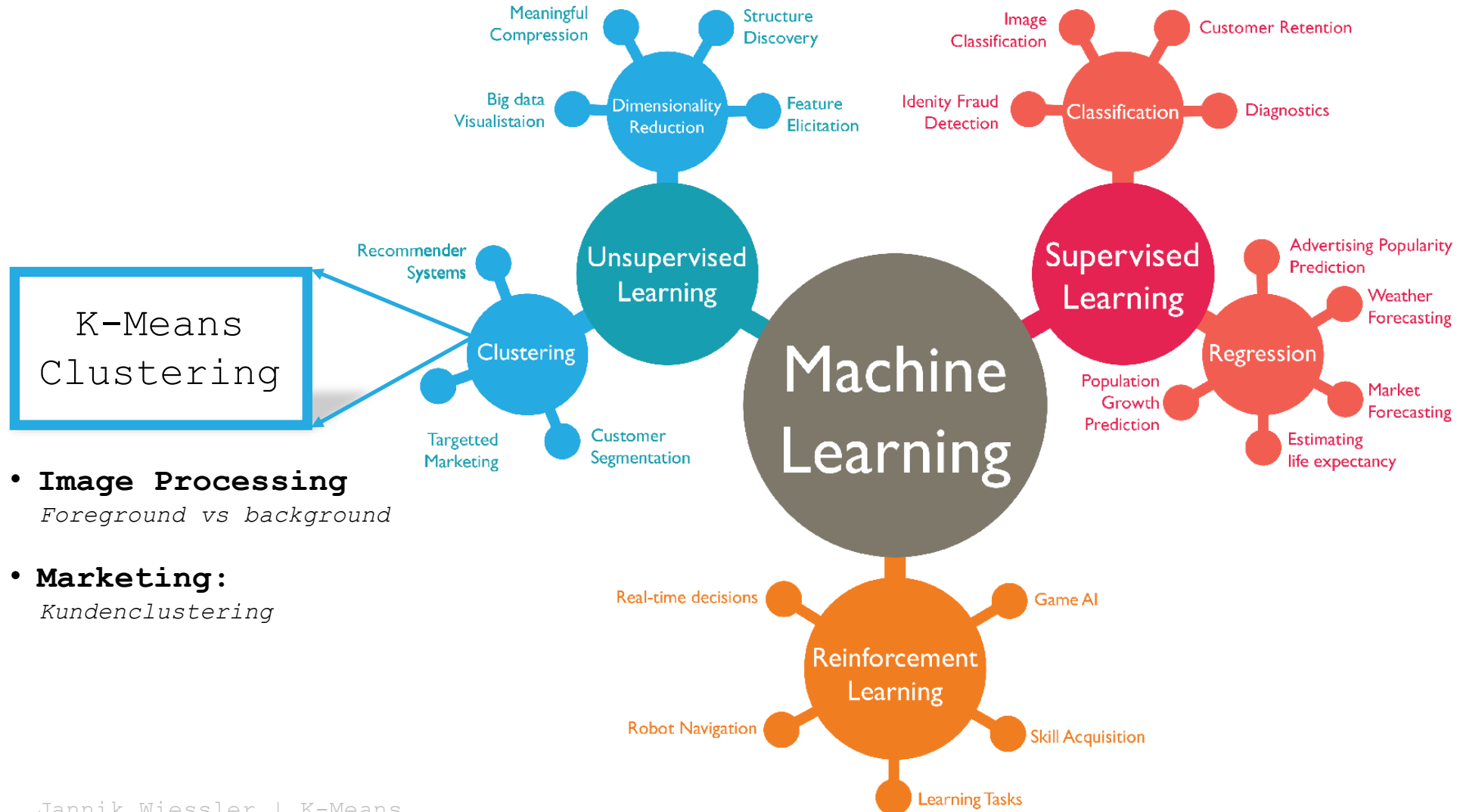
K-Means

Jannik Wiessler, Daimler Truck AG
Q2 2021

DHBW Stuttgart



Machine Learning



- **Image Processing**
Foreground vs background
- **Marketing:**
Kundenclustering

K-Means Algorithmus

1. Initialisierung

- Daten & #Cluster übergeben
- Initialisierung Center

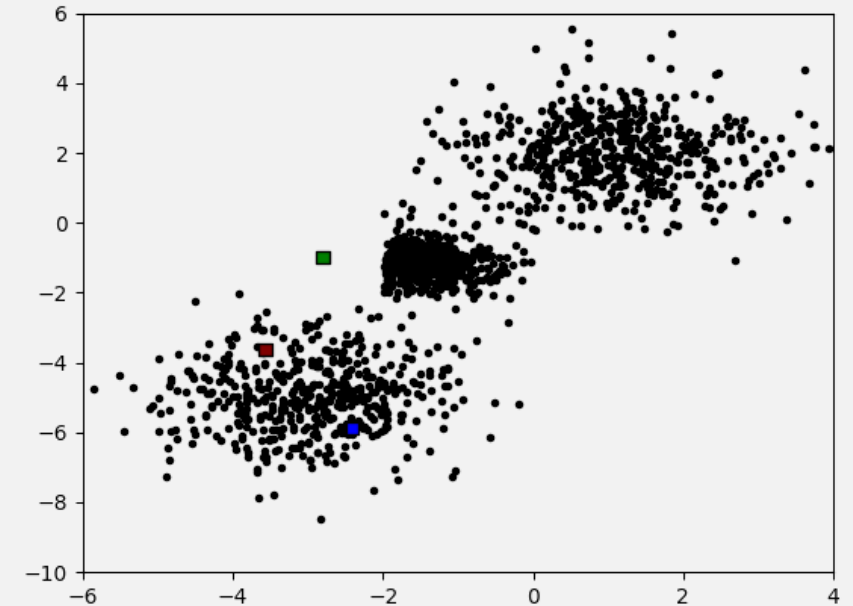
2. Berechnung der Cluster

- Abstände aller Datenpunkte zu Centern
- Zuteilung der Daten nach minimalstem Abstand zu entsprechendem Center

3. Berechnung der Center

- Schwerpunkt/ Mittelpunkt der Cluster

Data points	center		
	5.5	1.3	6.4
	1.5	7.6	4.9
	2.8	1.0	3.3
	8.8	1.6	6.2
	7.4	5.2	6.3
	7.9	1.8	0.2
	4.6	0.1	5.5



Pseudocode

Datensatz

K-Means Algorithmus

1. Initialisierung

- Daten & #Cluster übergeben
- Initialisierung Center

2. Berechnung der Cluster

- Abstände aller Datenpunkte zu Centern
- Zuteilung der Daten nach minimalstem Abstand zu entsprechendem Center

3. Berechnung der Center

- Schwerpunkt/ Mittelpunkt der Cluster

center

5.5	1.3	6.4
1.5	7.6	4.9
2.8	1.0	3.3
8.8	1.6	6.2
7.4	5.2	6.3
7.9	1.8	0.2
4.6	0.1	5.5

Data points

temp

$x_1 - X$	$y_1 - Y$
$x_2 - X$	$y_2 - Y$
\vdots	

data

x_1	y_1
\vdots	

center i

X	Y
-----	-----

=

$x_1 - X$	$y_1 - Y$
\vdots	

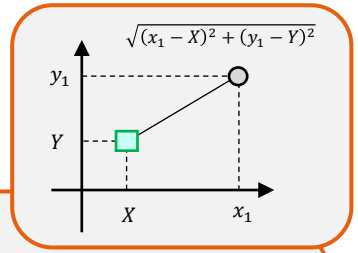
$(x_1 - X)^2$	$(y_1 - Y)^2$
\vdots	

$()^2$

sum
sqrt

\vdots

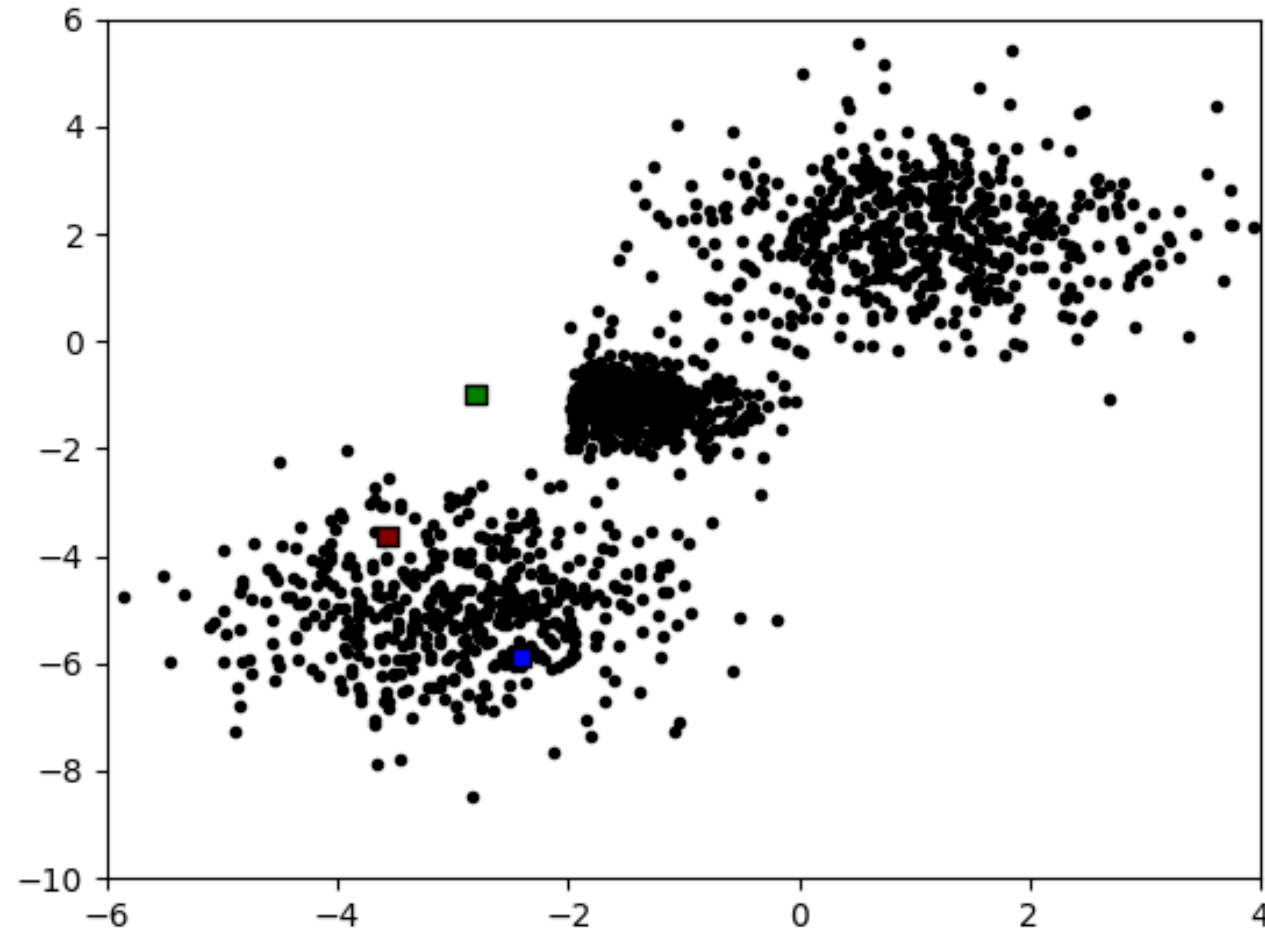
$\sqrt{(x_1 - X)^2 + (y_1 - Y)^2}$



Pseudocode

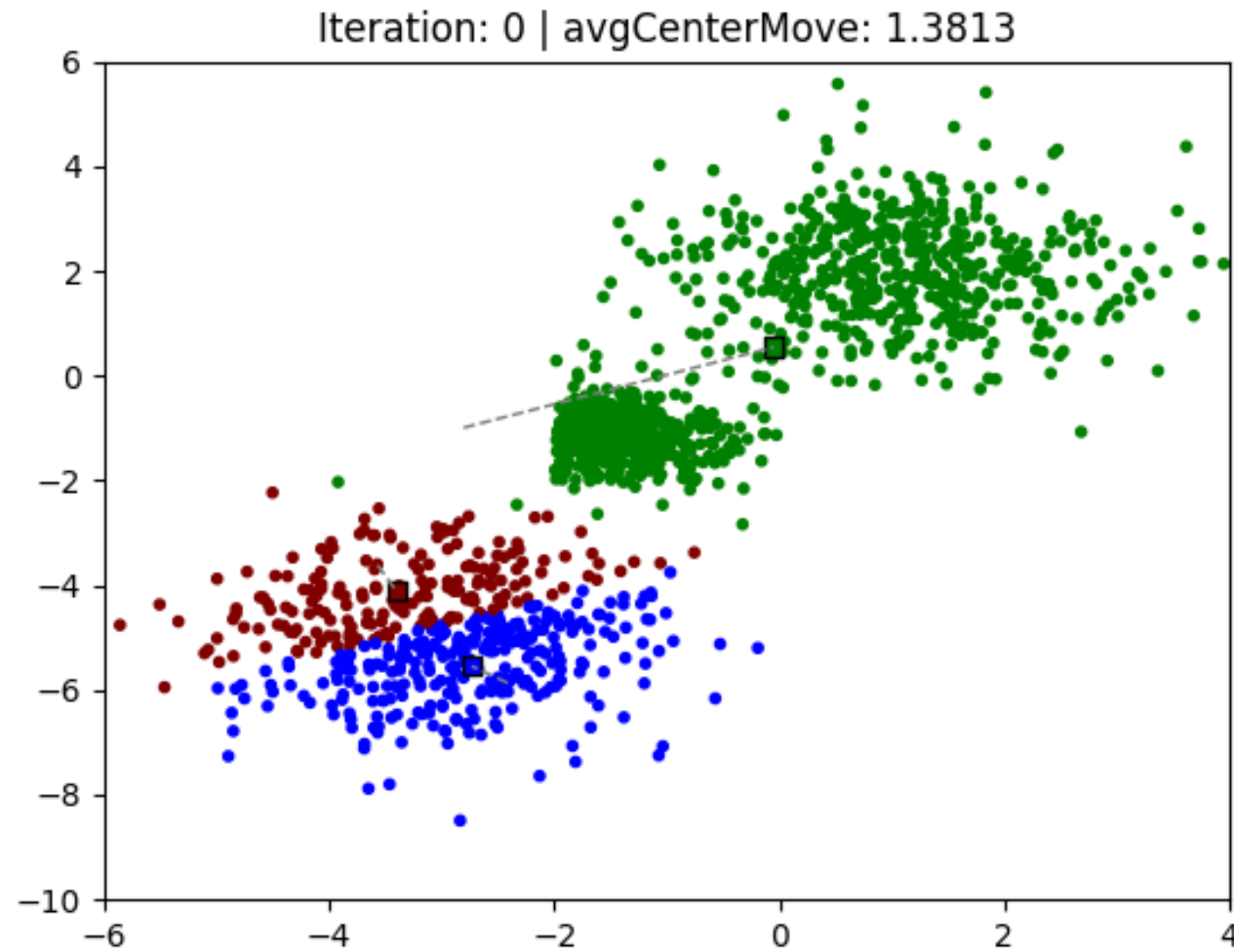
Calc distance

K-Means Algorithmus



Initialisierung

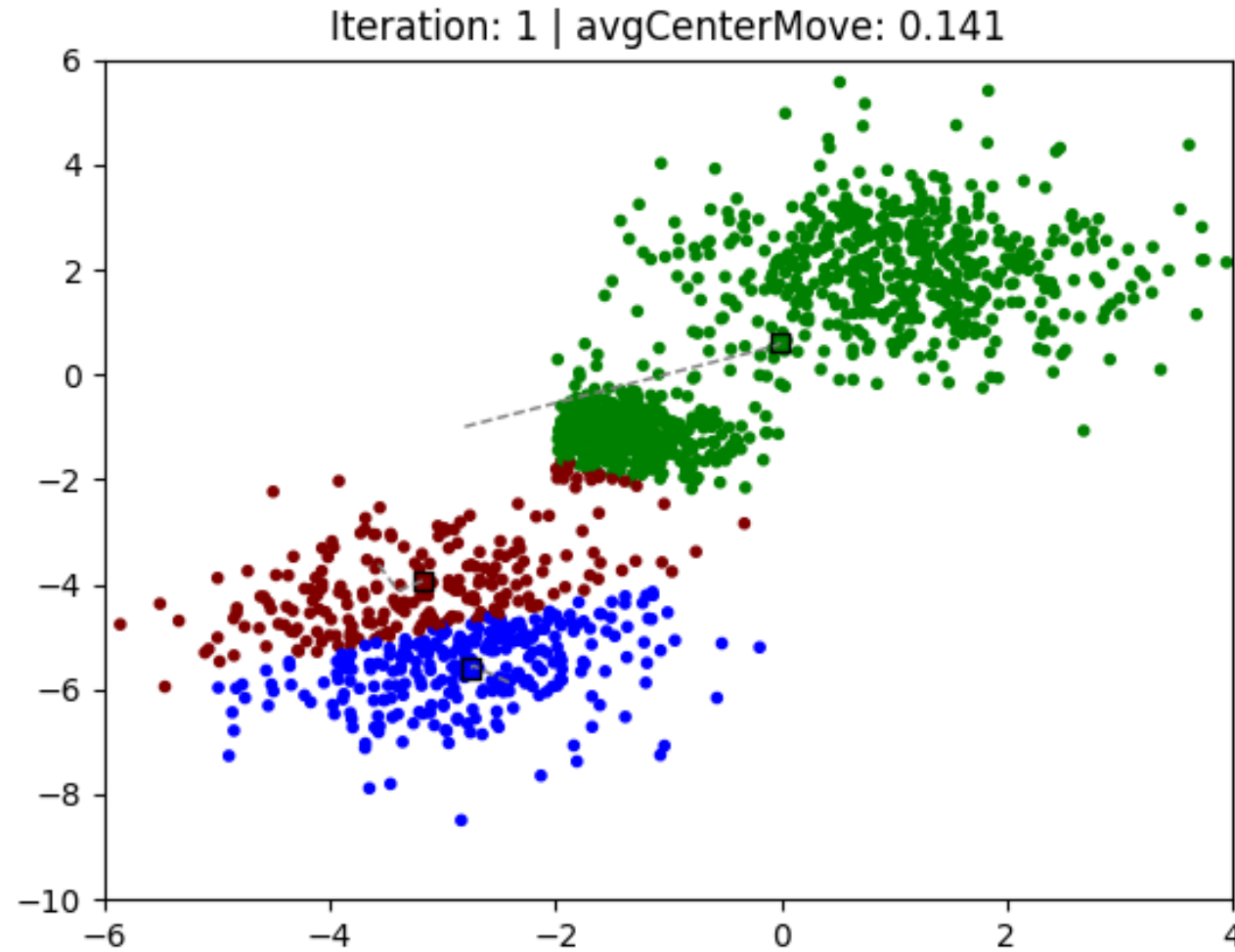
K-Means Algorithmus



Algorithmus

loop = 0

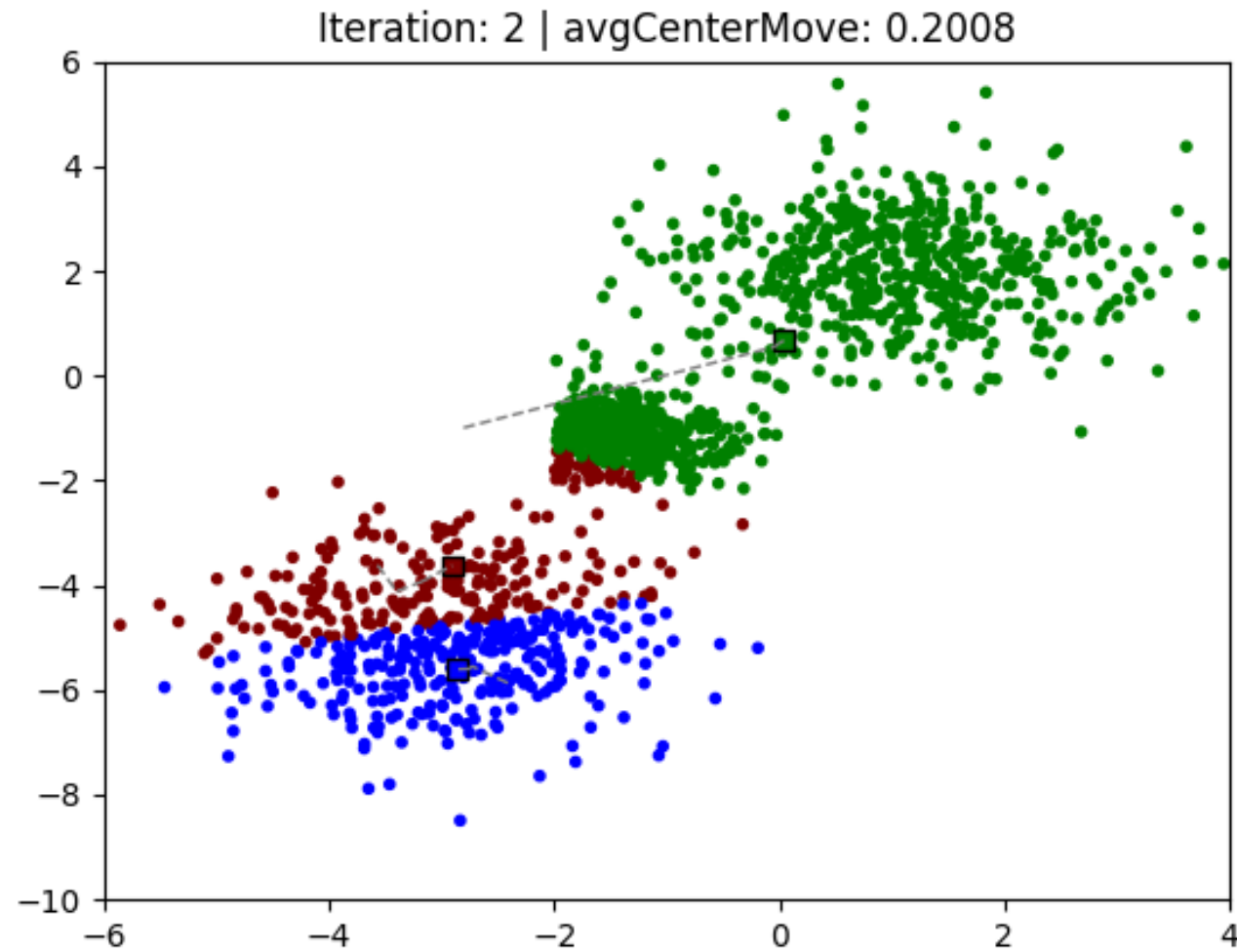
K-Means Algorithmus



Algorithmus

loop = 1

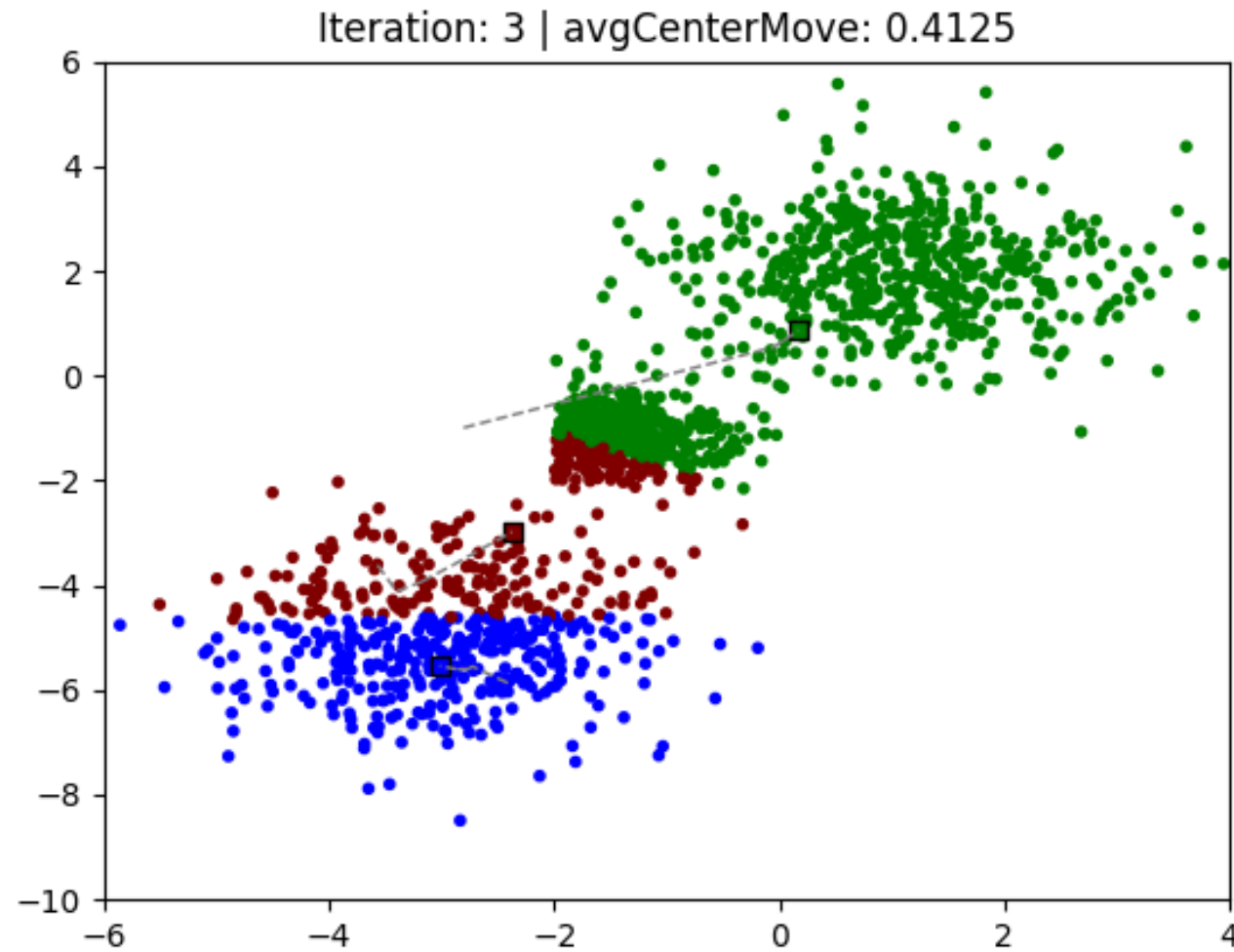
K-Means Algorithmus



Algorithmus

loop = 2

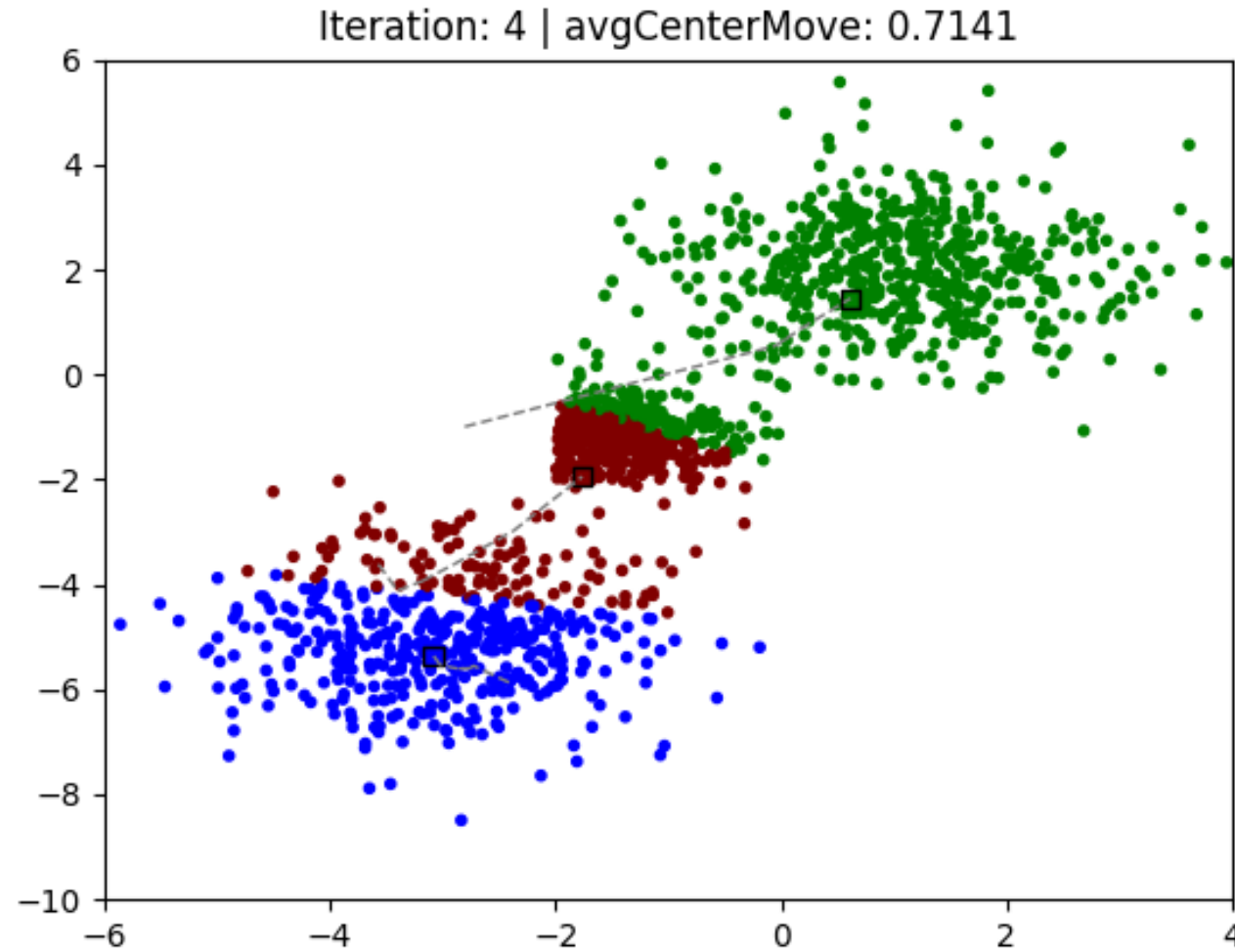
K-Means Algorithmus



Algorithmus

loop = 3

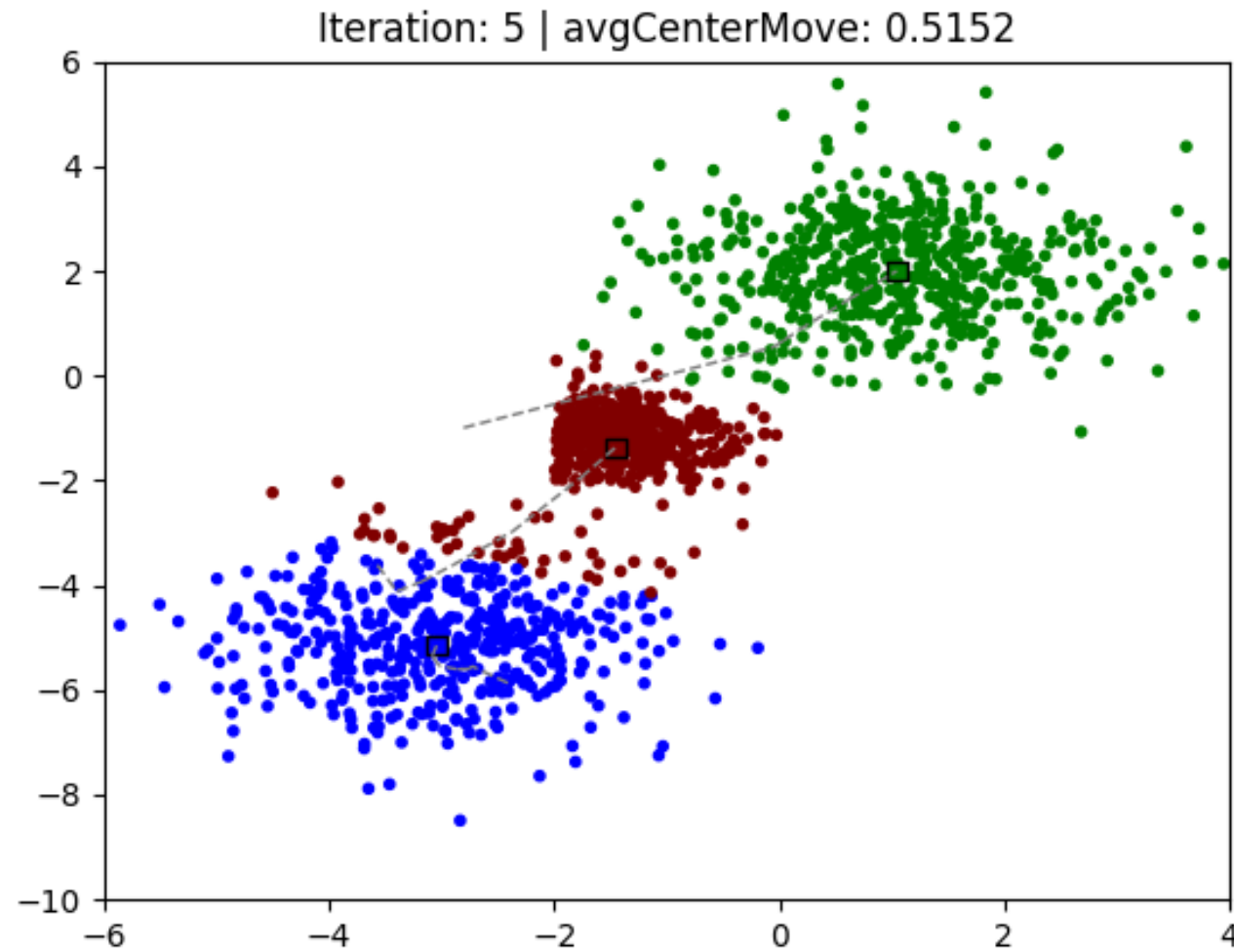
K-Means Algorithmus



Algorithmus

loop = 4

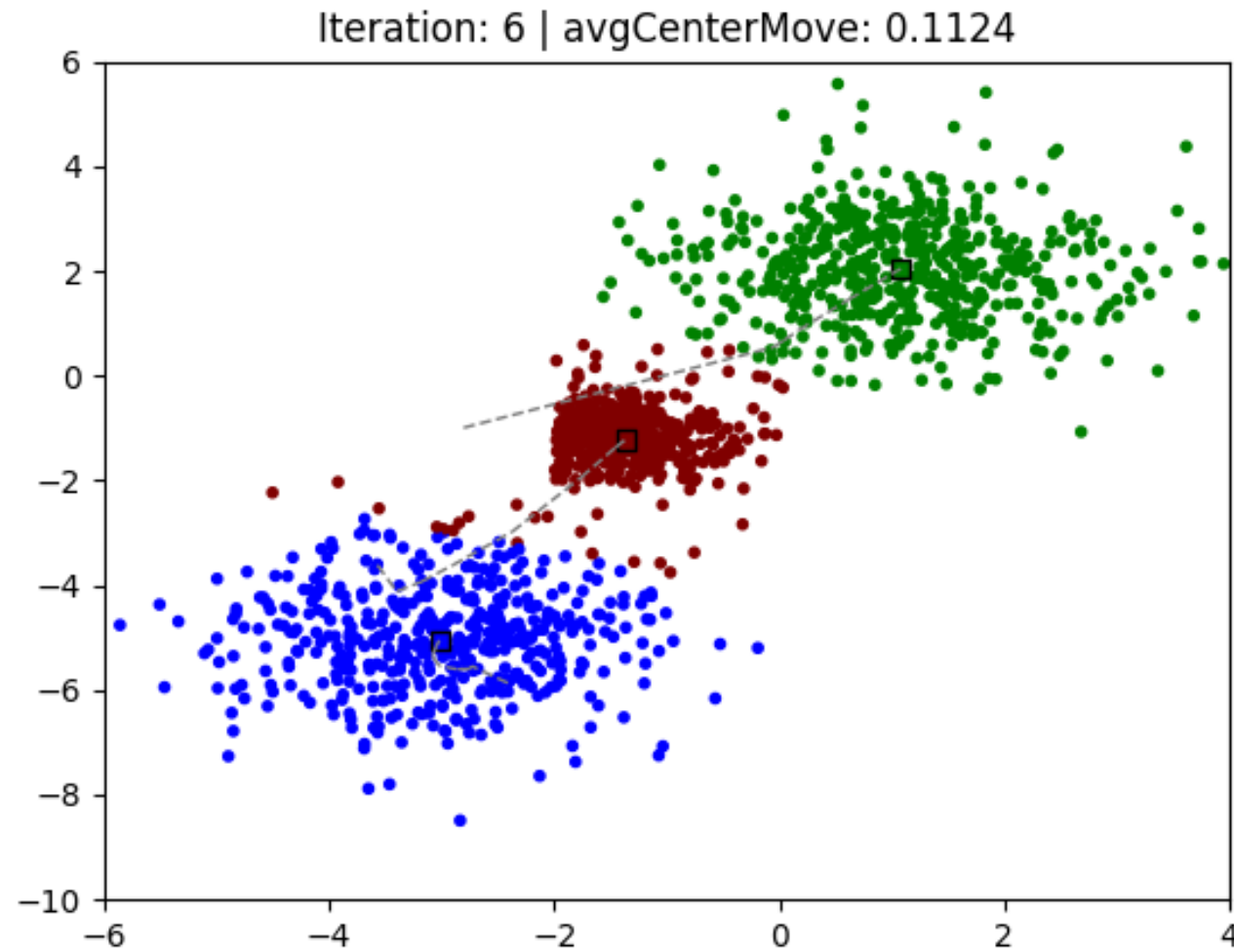
K-Means Algorithmus



Algorithmus

loop = 5

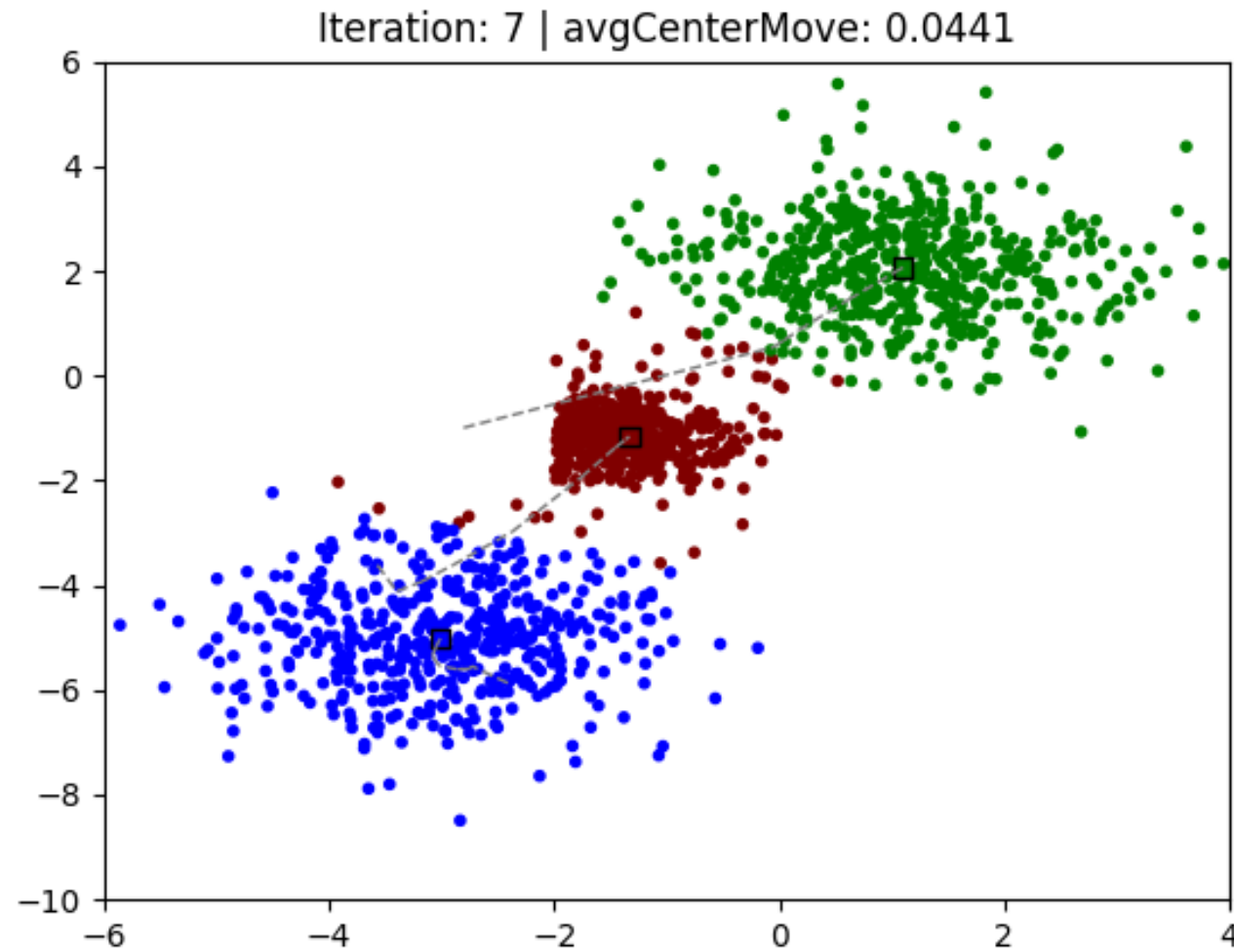
K-Means Algorithmus



Algorithmus

loop = 6

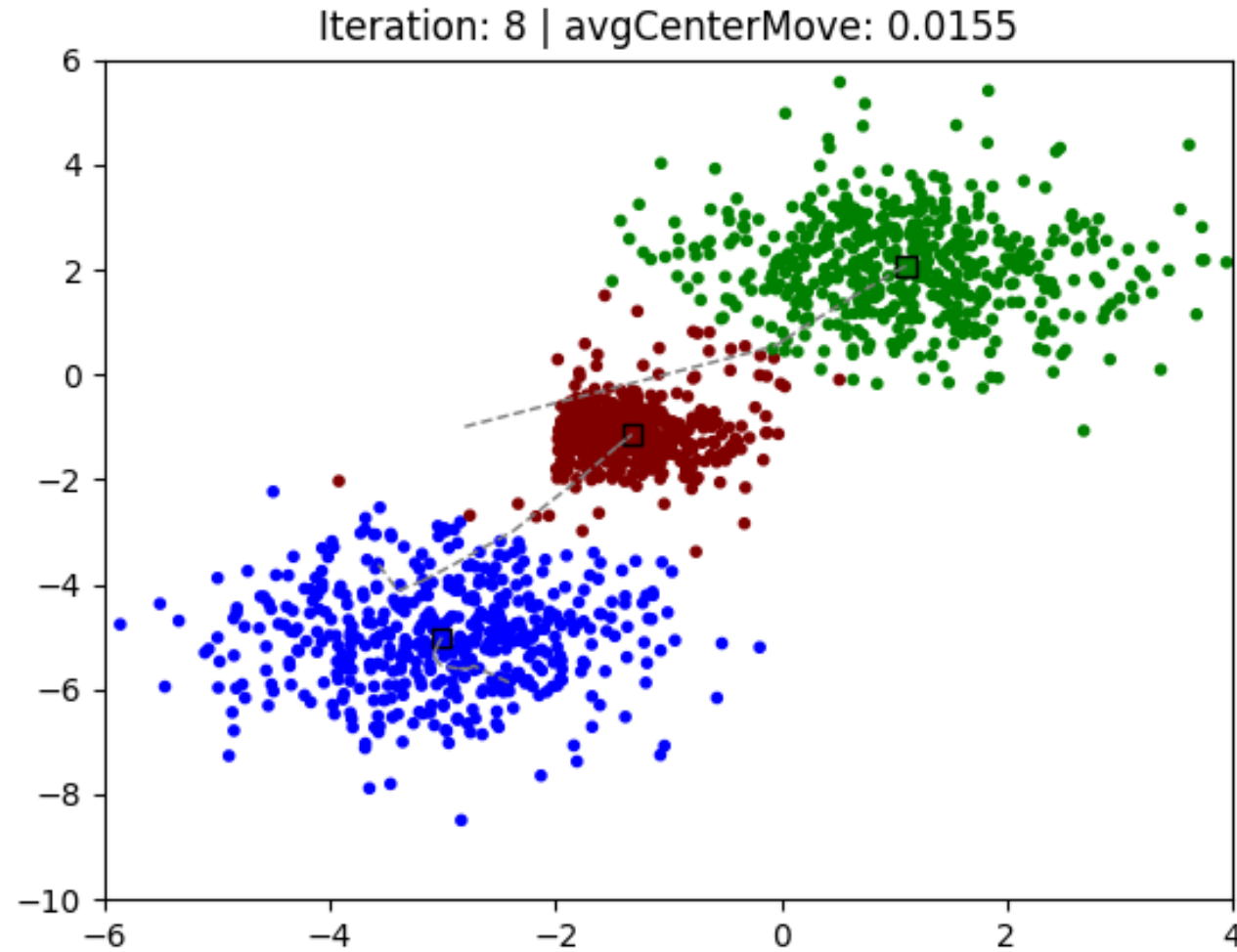
K-Means Algorithmus



Algorithmus

loop = 7

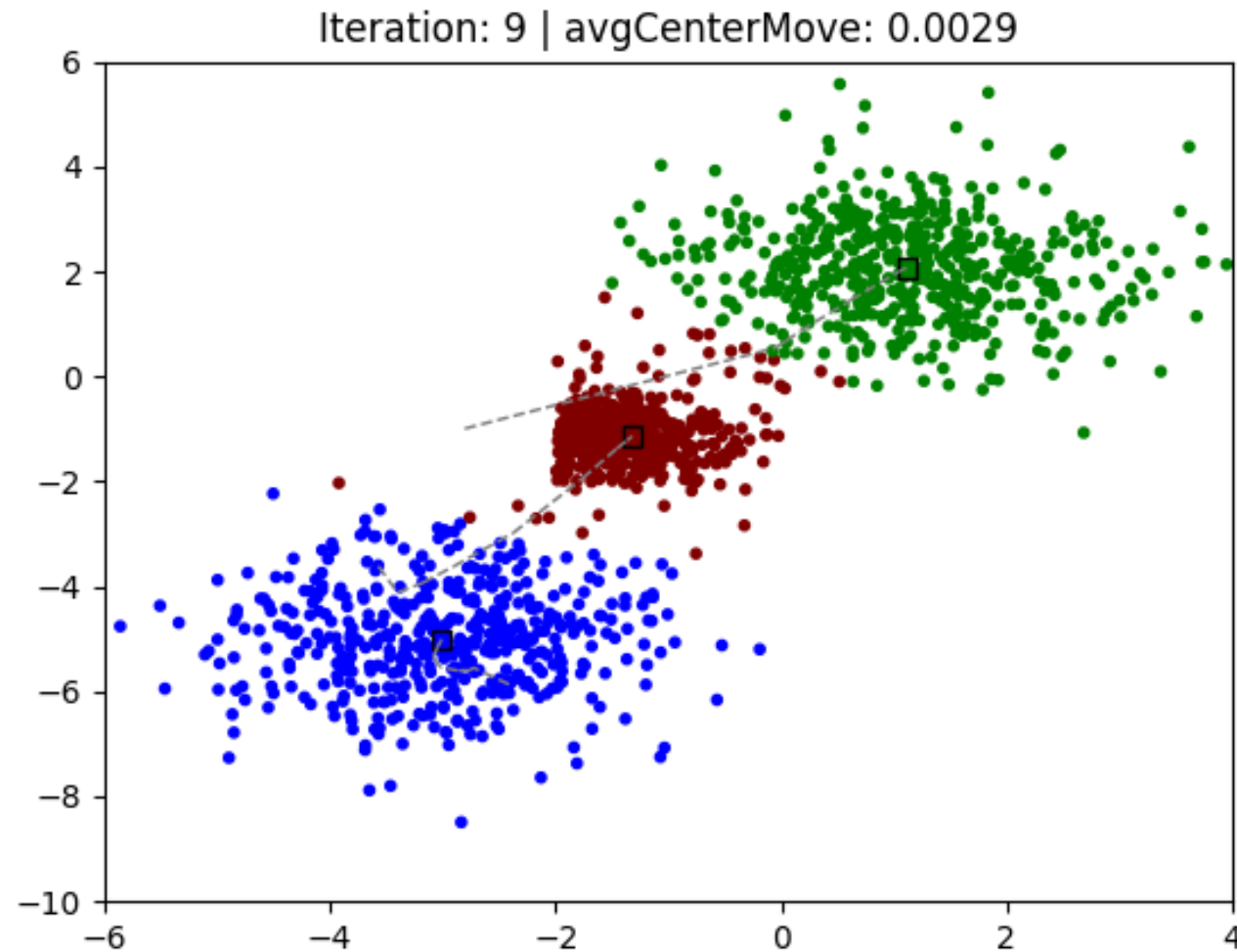
K-Means Algorithmus



Algorithmus

loop = 8

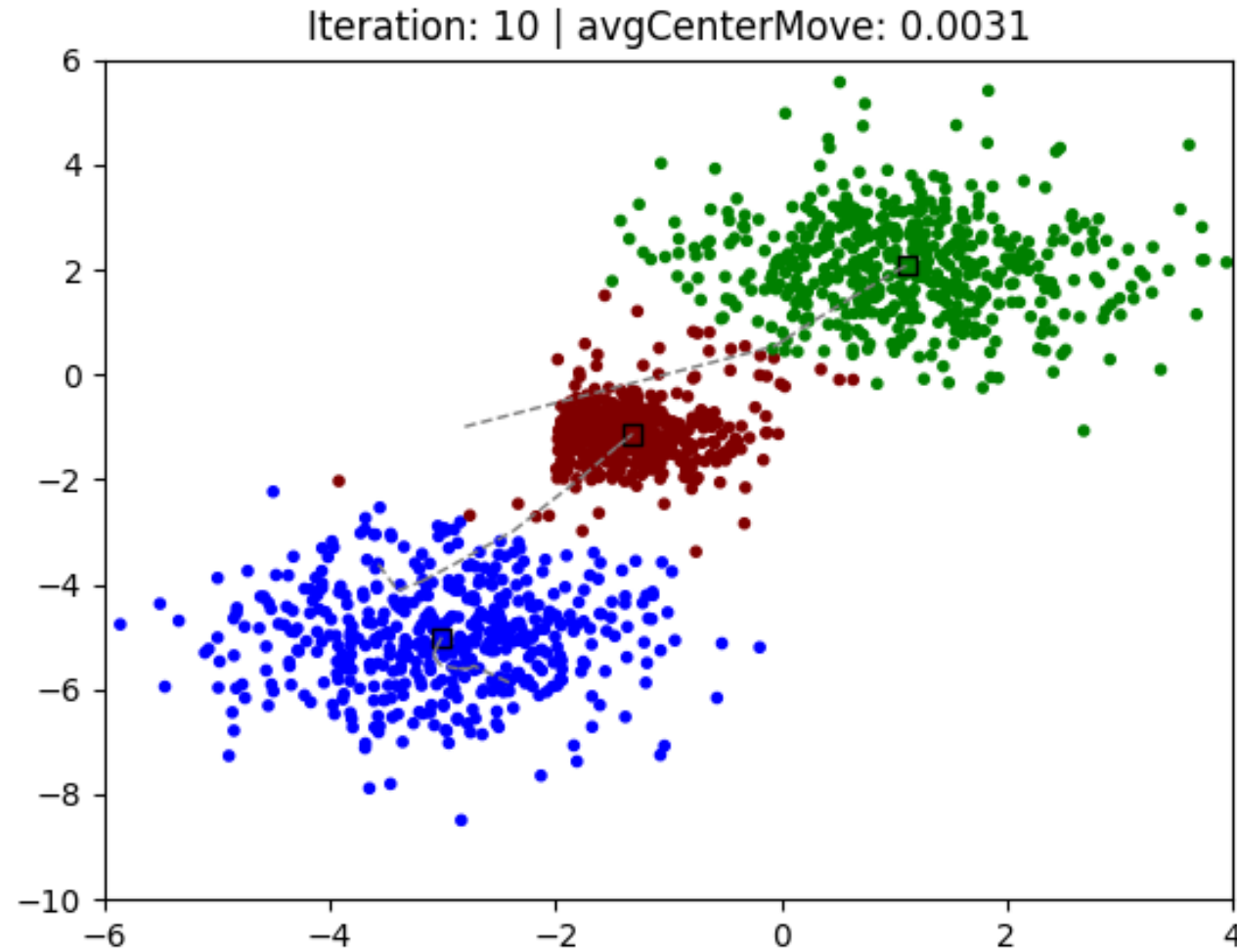
K-Means Algorithmus



Algorithmus

loop = 9

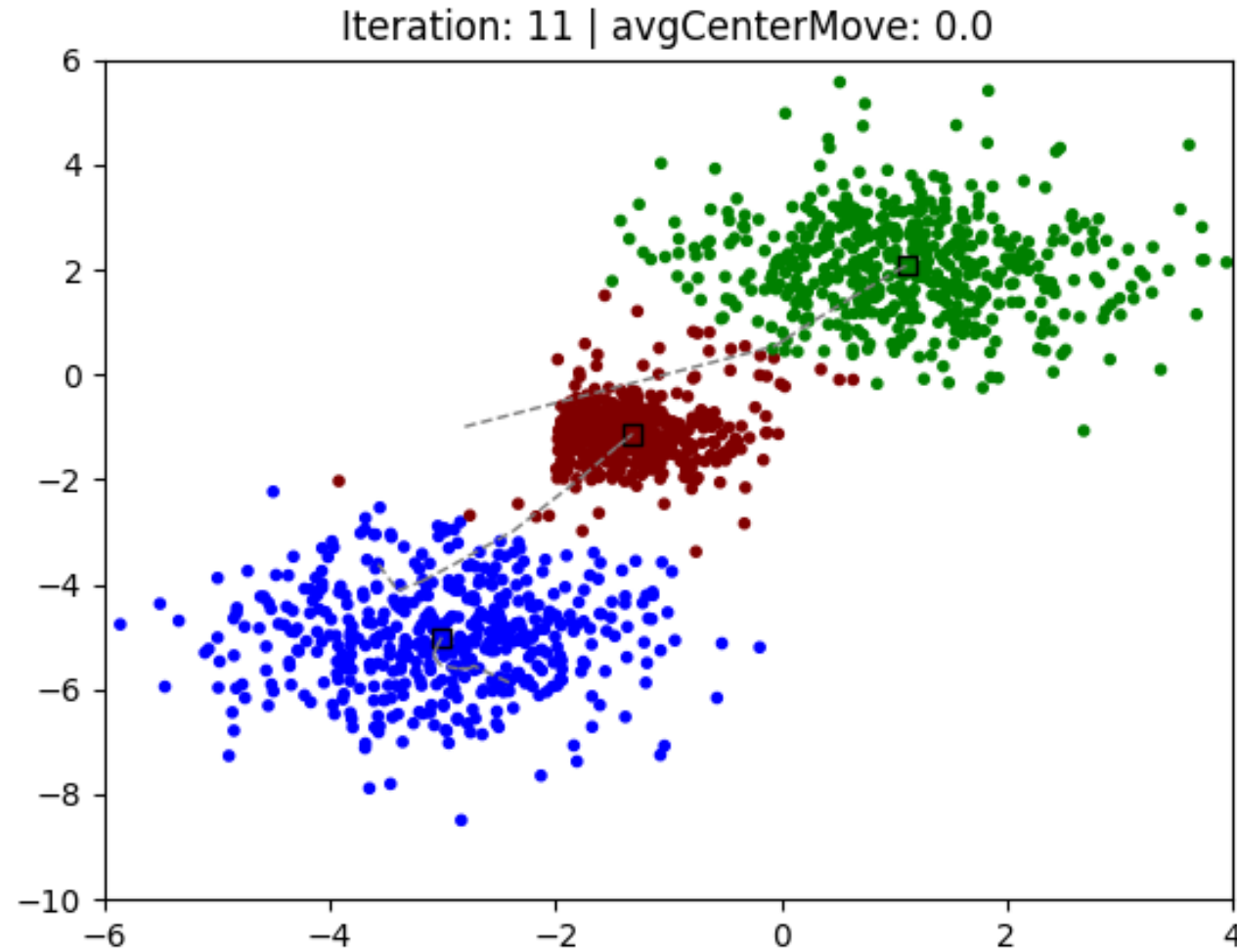
K-Means Algorithmus



Algorithmus

loop = 10

K-Means Algorithmus



terminiert

loop = 11