HW#14

서왕규

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CONTENTS

01. Procedure

1. 사진 데이터 선택



2. Mean shift clustering & K-means clustering

- Mean shift clustering

1. h값을 갖는 윈도우에 포함되는 데이터들의 Mode 값으로 윈도우의 중심을 이동하는 과정을 반복
2. 수렴하면, 수렴하는 값을 클러스터의 mode 값으로 선택

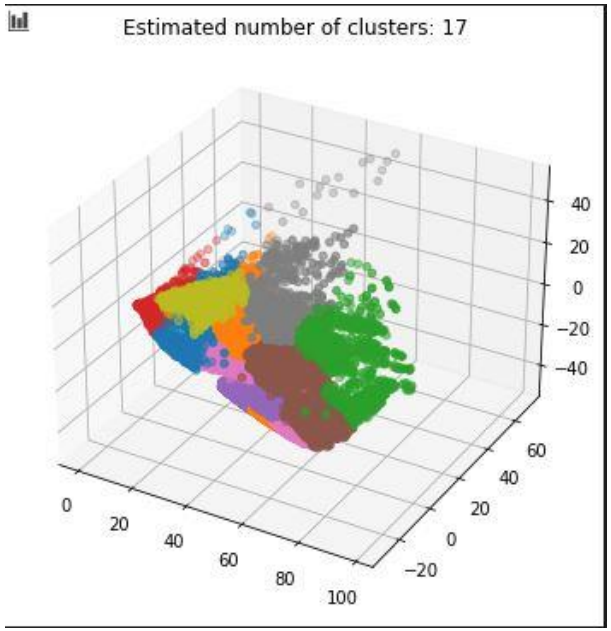
✓ 적절한 파라미터 h를 실험적으로 선택

- K-means clustering

1. 각 좌표를 가장 가까운 centroid의 클러스터로 분류
2. 클러스터의 centroid 값을 재계산
3. 이전 centroid 값에서 변화가 적어, 수렴한다고 판단할 수 있을 때까지, 1,2를 반복 수행
4. 수렴하면, 클러스터의 centroid를 클러스터의 값으로 선택

3. 클러스터 결과 출력 및 복원 사진 비교(목표 결과물)

- LAB 공간의 클러스터 시각화



- 원본, 복원사진(mean shift, kmeans) 비교

02. Mean shift clustering

- 사진별 window size 선택

❖ Image1

Window size	# of clusters
7	158
9	60
11	26
13	16
15	12

Fig 1. Recovery with h=13

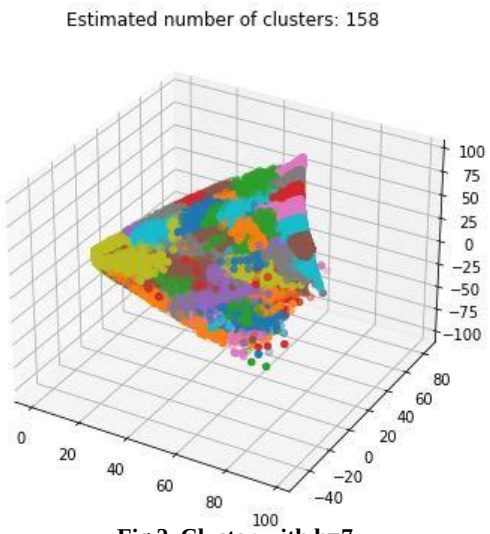


Fig 2. Cluster with h=7

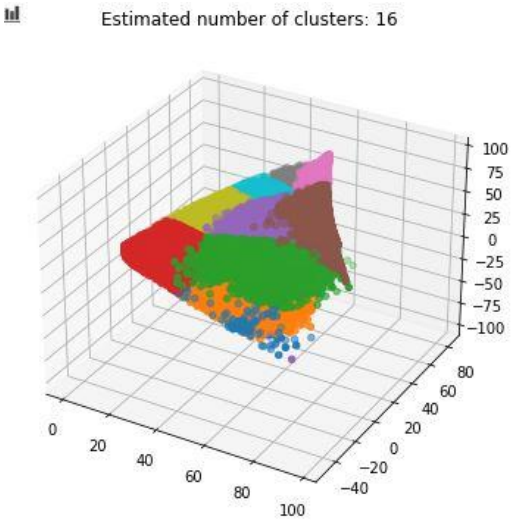


Fig 3. Cluster with h=13

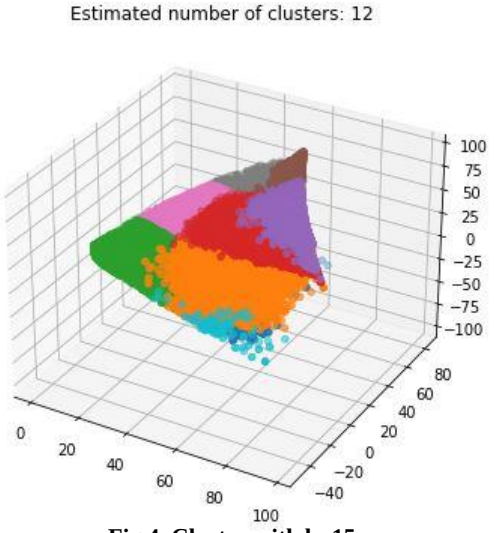


Fig 4. Cluster with h=15

02. Mean shift clustering

❖ Image1

Fig 1. Recovery with h=13

Fig 2. Recovery with h=15

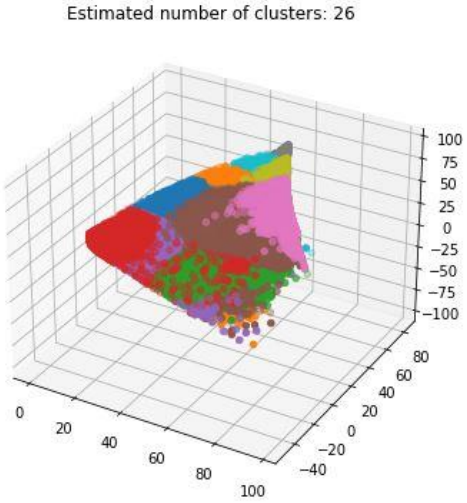


Fig 3. Cluster with h=9

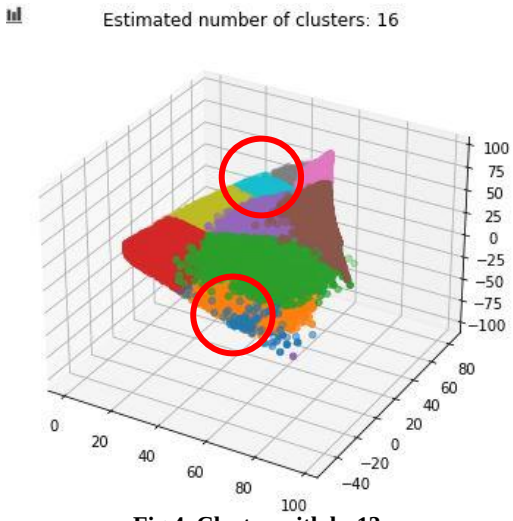


Fig 4. Cluster with h=13

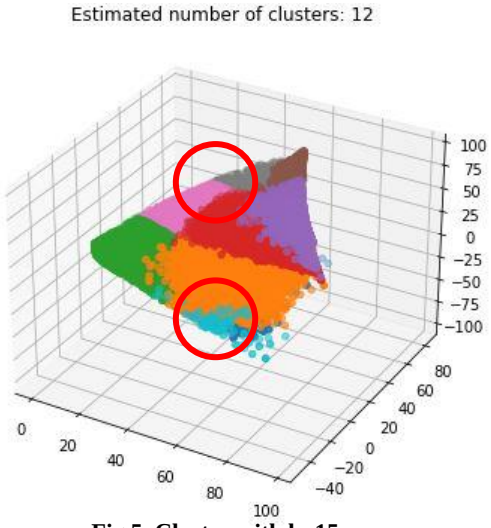


Fig 5. Cluster with h=15

✓ h 크기가 증가할 수록, 클러스터의 개수가 적음

→ 클러스터링으로 복원하는 이미지의 색상의 개수가 적어짐

16개의 클러스터를 갖는 h=13 선택

02. Mean shift clustering

- 사진별 window size 선택

❖ Image1

Window size	# of clusters
7	158
9	60
11	26
13	16
15	12

❖ Image2

Window size	# of clusters
7	37
9	17
11	11
13	7
15	4

❖ Image3

Window size	# of clusters
5	30
6	21
7	14
8	11
9	10

사진별로 윈도우 사이즈에 따른 cluster개수가 다름

→ 3개의 사진에 다른 h적용

Image	Image1	Image2	Image3
h	13	9	7

14개 이상의 클러스터를 갖는 적절한 window size h를 선정

02. Mean shift clustering

Image1

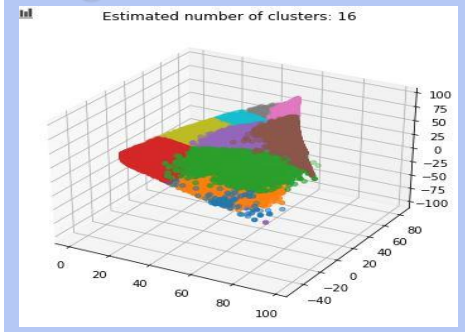


Fig 1. Cluster with h=13

Fig 2. Recovery with h=13

Image2

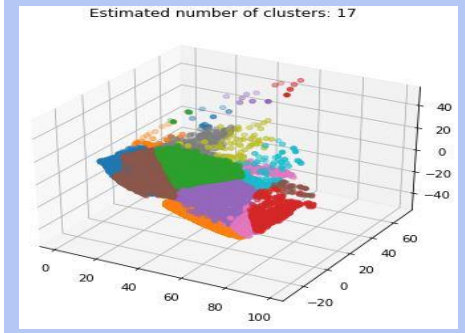


Fig 3. Cluster with h=9

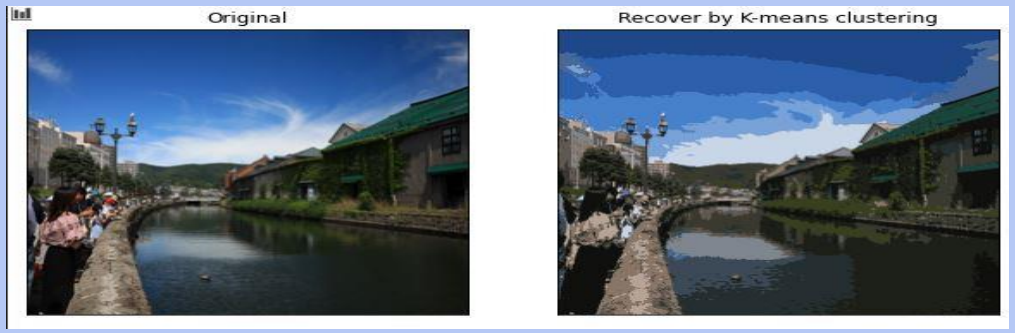


Fig 4. Recovery with h=9

Image3

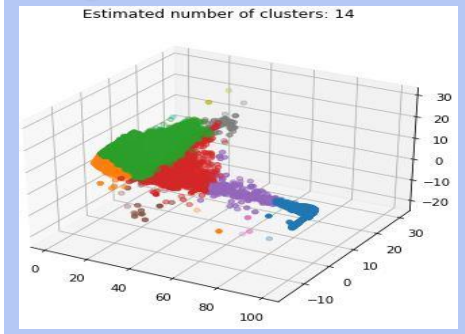


Fig 5. Cluster with h=7

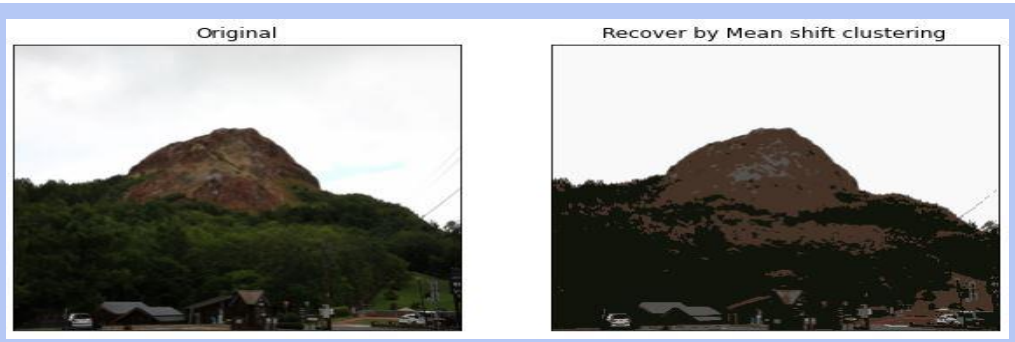


Fig 6. Recovery with h=7

03. K-means clustering

Image1

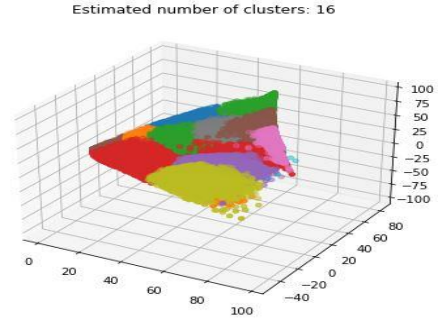


Fig 1. Cluster with k=16

Fig 2. Recovery with k=16

Image2

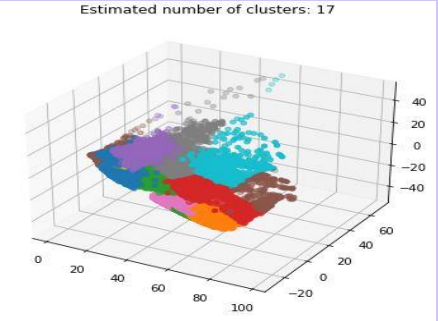


Fig 3. Cluster with k=17

Fig 4. Recovery with k=17

Image3

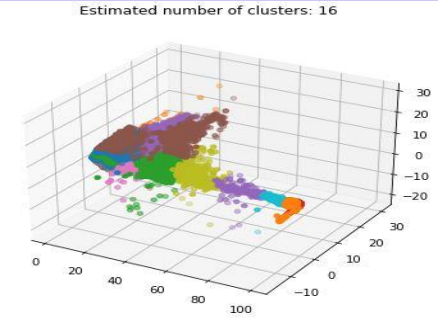


Fig 5. Cluster with k=16

Fig 6. Recovery with k=16

❖ Image1

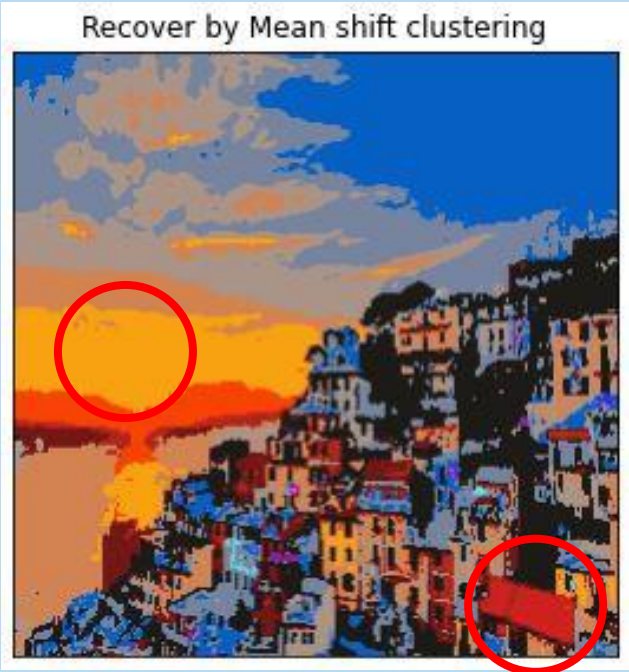


Fig 1. Recovery by Mean shift clustering

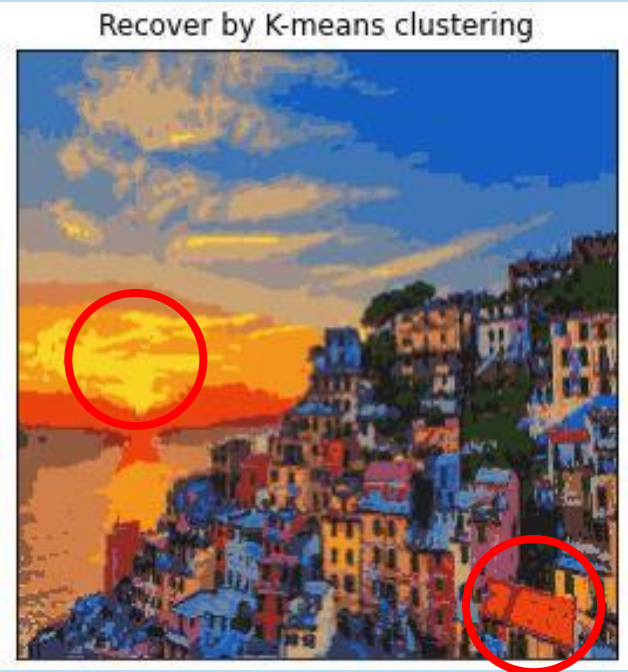


Fig 2. Recovery by K-means clustering

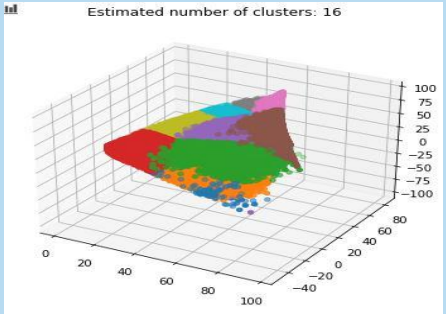


Fig 3. Cluster by mean shift clustering

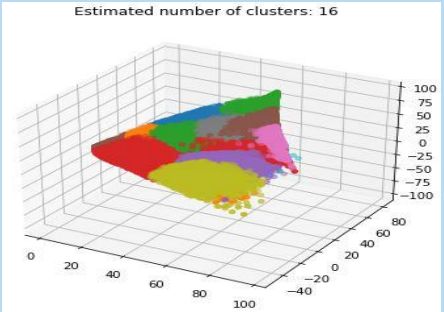


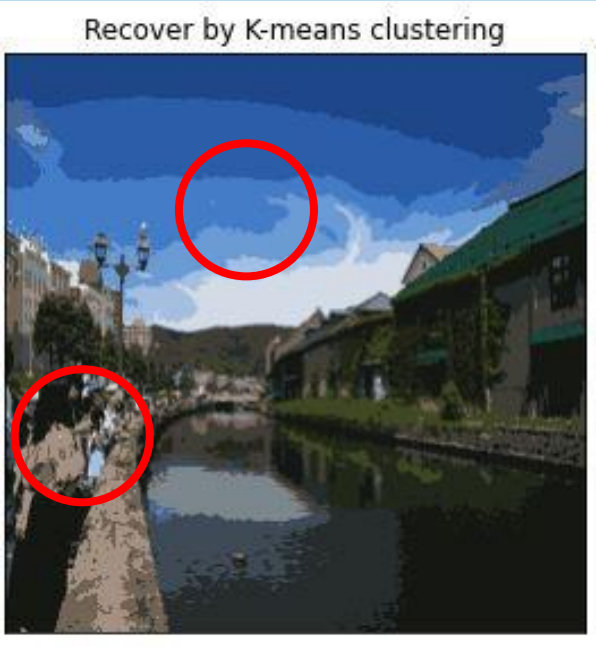
Fig 4. Cluster by K-means clustering

이미지를 지배하는 색상이라도 single mode를 갖는 분포를 가지고 있는 경우,

Means shift는 동일한 클러스터에 포함시킴

❖ Image2

Fig 1. Recovery by Mean shift clustering



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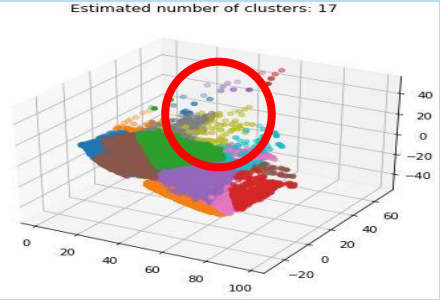

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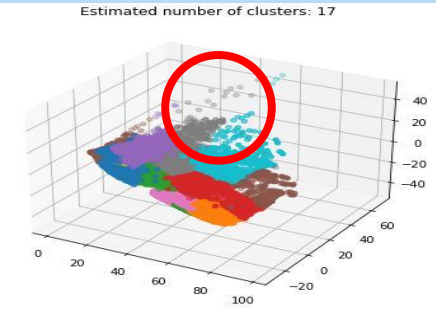

Fig 4. Cluster by K-means clustering

정해진 window size에 window의 중심을 이동시키는 means shift의 경우,
유사한 색상이라도 locally maximum probability를 갖는 색상으로 수렴

❖ Image3

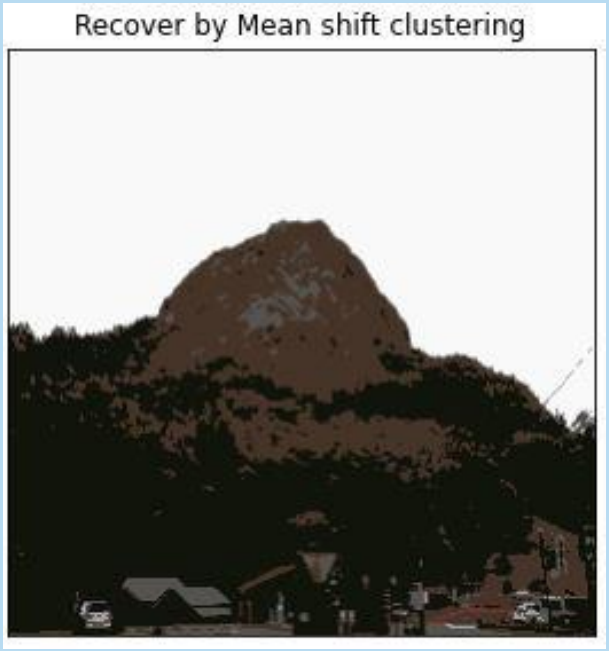

Fig 1. Recovery by Mean shift clustering

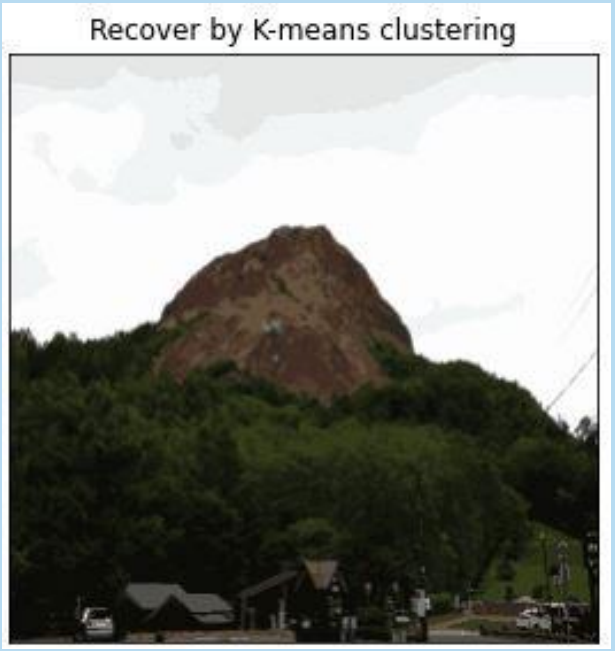

Fig 2. Recovery by K-means clustering

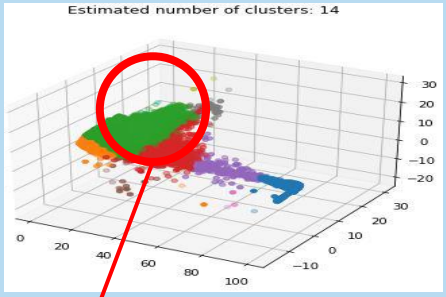

Fig 3. Cluster by mean shift clustering

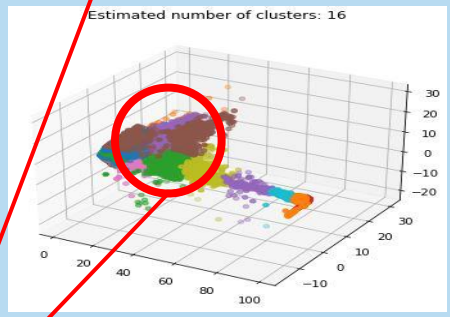

Fig 4. Cluster by K-means clustering

이미지를 지배하는 색상이라도 single mode를 갖는 분포를 가지고 있는 경우,

Means shift는 동일한 클러스터에 포함시킴

K-means는 에러를 최소화 하기 위해, 다른 클러스터로 구분