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Life Changing Education

Chapter 19. k Nearest Neighber

k Nearest Neighber

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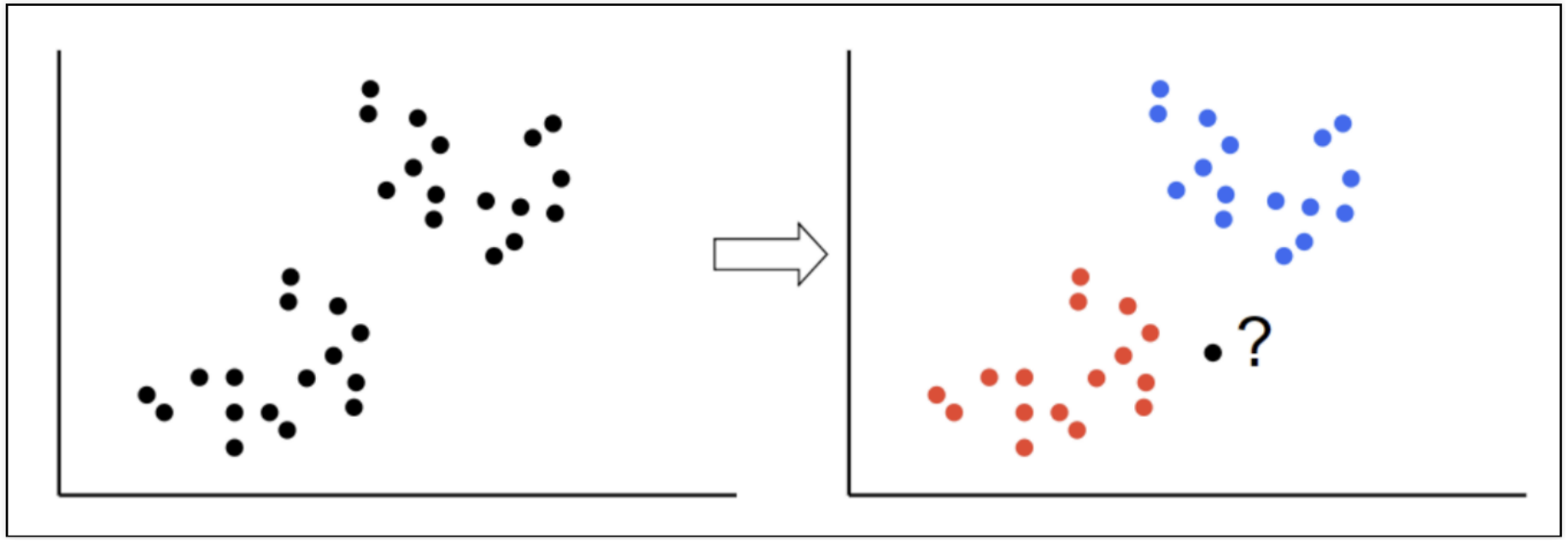
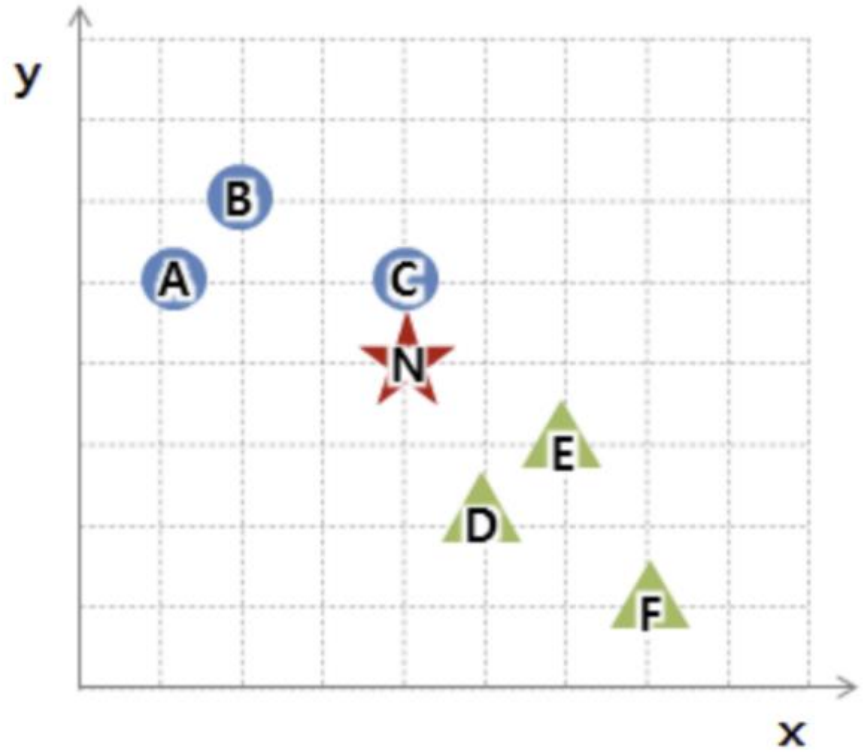
kNN이란



- 새로운 데이터가 있을 때, 기존 데이터의 그룹 중 어떤 그룹에 속하는지를 분류하는 문제
- k는 몇 번째 가까운 데이터까지 볼 것인가를 정하는 수치

좀더 상세히

데이터	x좌표	y좌표	그룹
A	1	5	●
B	2	6	●
C	4	5	●
D	5	2	▲
E	6	3	▲
F	7	1	▲
N	4	4	?



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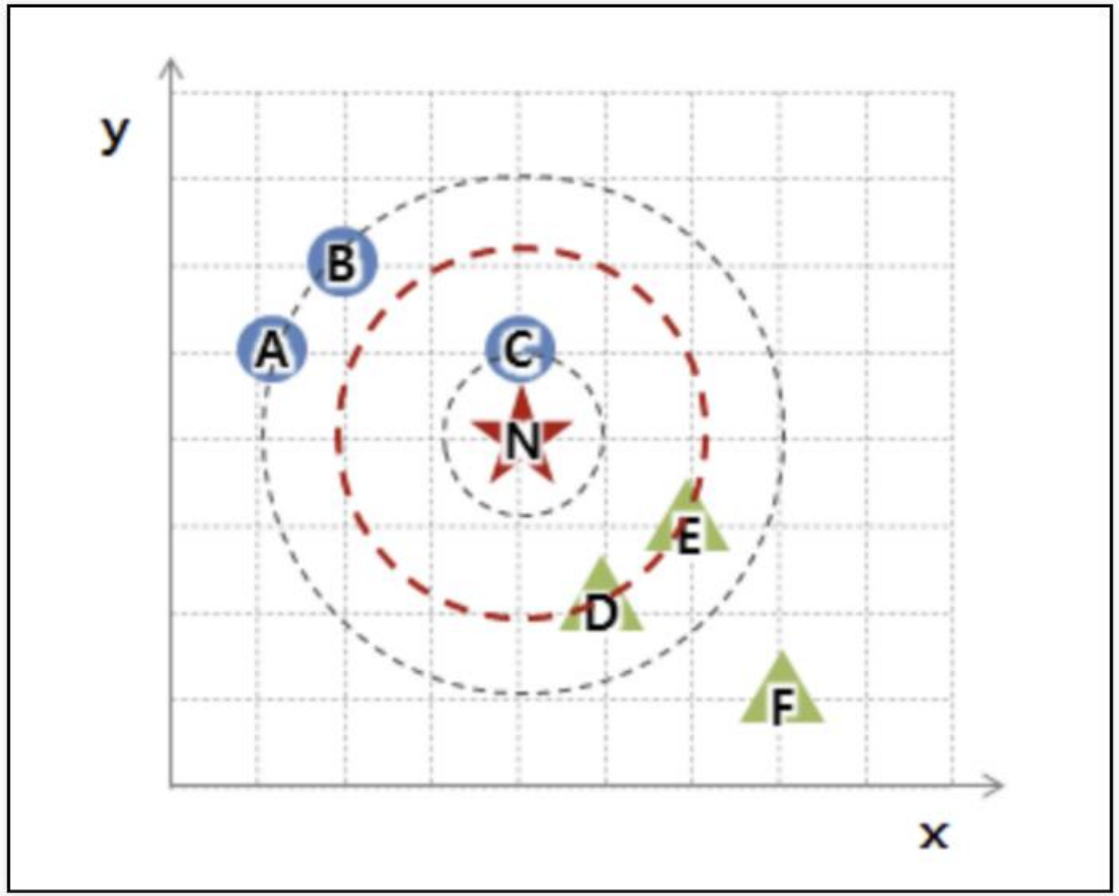
k=5로 설정하면 5번째까지 가까운 데이터



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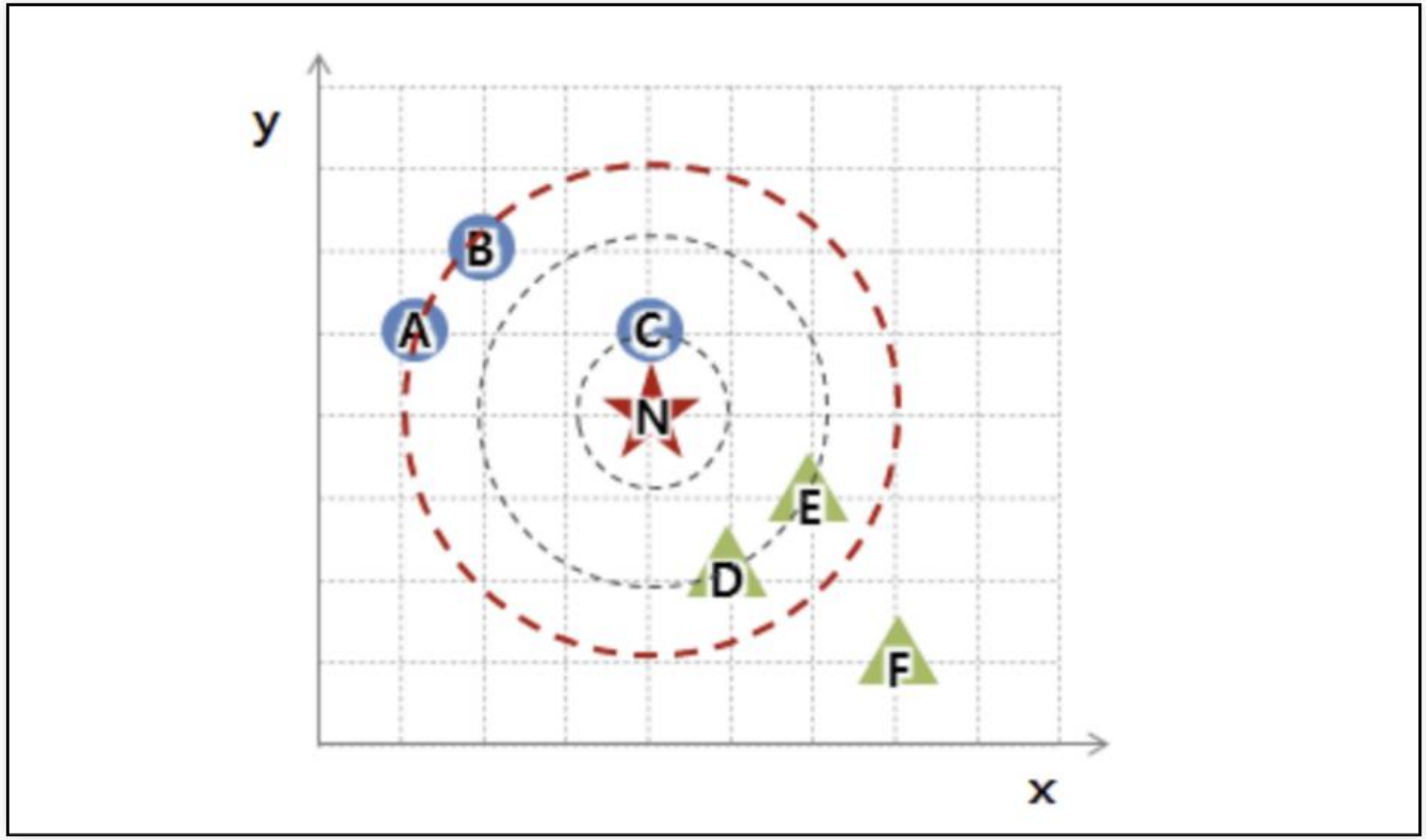
k값에 따라 결과값이 바뀔 수 있다



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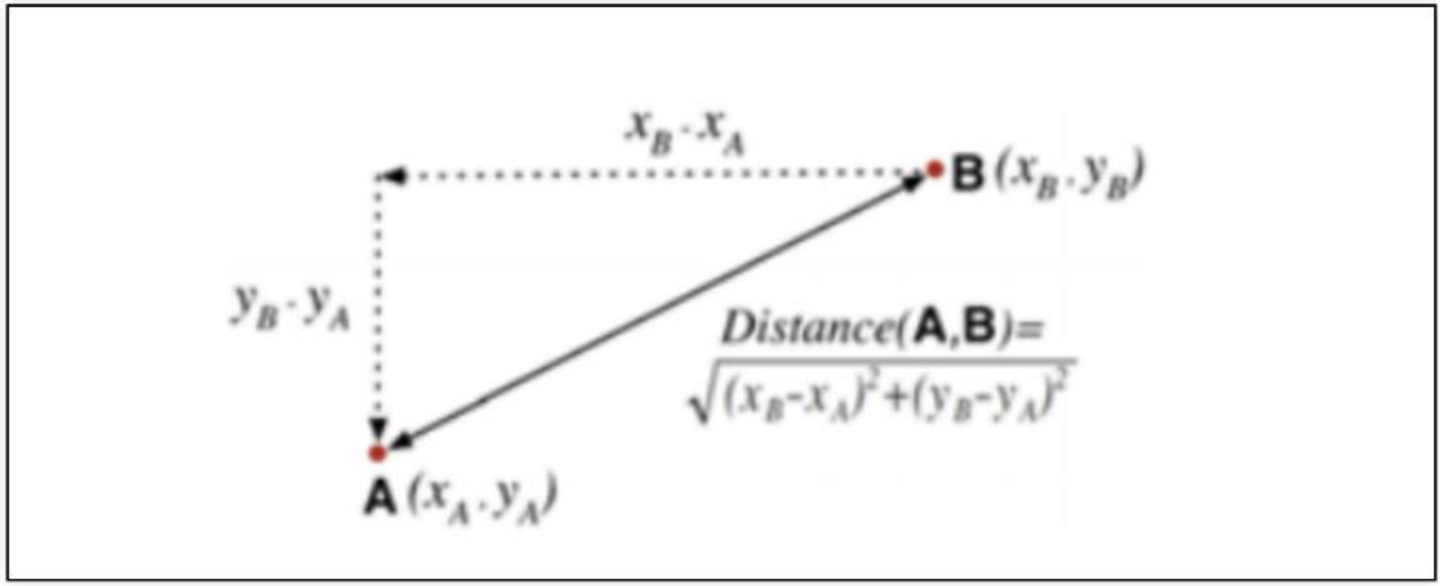
거리를 계산하는 것? - 유클리드 기하



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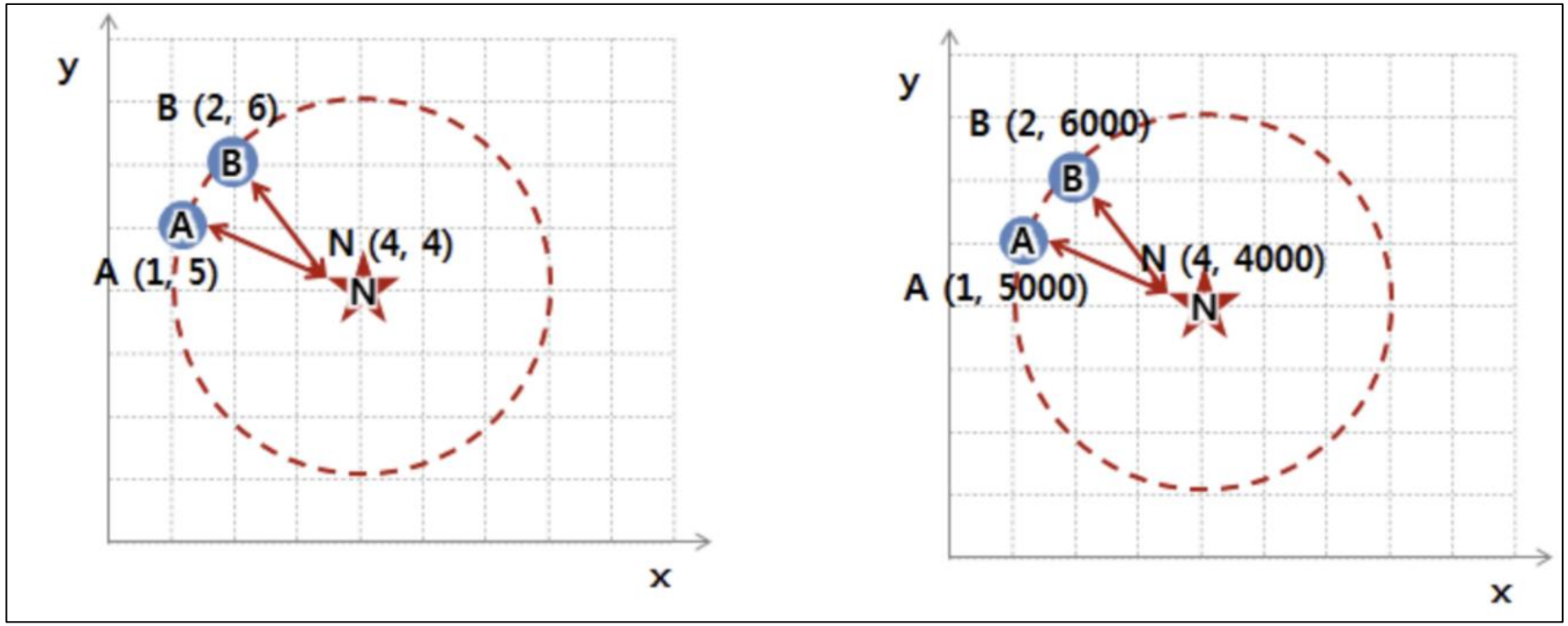
단위에 따라 바뀔 수도 있다 - 표준화 필요



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장단점

- 실시간 예측을 위한 학습이 필요치 않다.
- 결국 속도가 빨라진다.
- 고차원 데이터에는 적합하지 않다.

연습

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iris 데이터

```
from sklearn.datasets import load_iris

iris = load_iris()
```

```
from sklearn.model_selection import train_test_split

X_train, X_test, y_train, y_test = \
                train_test_split(iris.data, iris.target,
                                 test_size=0.2, random_state=13,
                                 stratify=iris.target)
```

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kNN 학습

```
from sklearn.neighbors import KNeighborsClassifier

knn = KNeighborsClassifier(n_neighbors=5)
knn.fit(X_train,y_train)
```

```
KNeighborsClassifier(algorithm='auto', leaf_size=30, metric='minkowski',
                     metric_params=None, n_jobs=None, n_neighbors=5, p=2,
                     weights='uniform')
```

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accuracy

```
from sklearn.metrics import accuracy_score

pred = knn.predict(X_test)
print (accuracy_score(y_test, pred))
```

```
0.9666666666666667
```

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간단한 성과

```
from sklearn.metrics import classification_report, confusion_matrix

print(confusion_matrix(y_test, pred))
print(classification_report(y_test, pred))
```

```
[[10  0  0]
 [ 0  9  1]
 [ 0  0 10]]
              precision    recall  f1-score   support

           0       1.00      1.00      1.00        10
           1       1.00      0.90      0.95        10
           2       0.91      1.00      0.95        10

    accuracy                           0.97        30
   macro avg       0.97      0.97      0.97        30
weighted avg       0.97      0.97      0.97        30
```