Paradigms of Learning

Broad Paradigms

Supervised Learning

- *Classification*
  Binary, Multiclass, Ordinal
- *Regression*
- *Ranking*
- *Structure learning*

Unsupervised Learning

- *Clustering*
- *Representation learning*

Sequential Learning

- *Online learning*
- *Multi-armed Bandits*
- *Reinforcement learning*

Image: Google

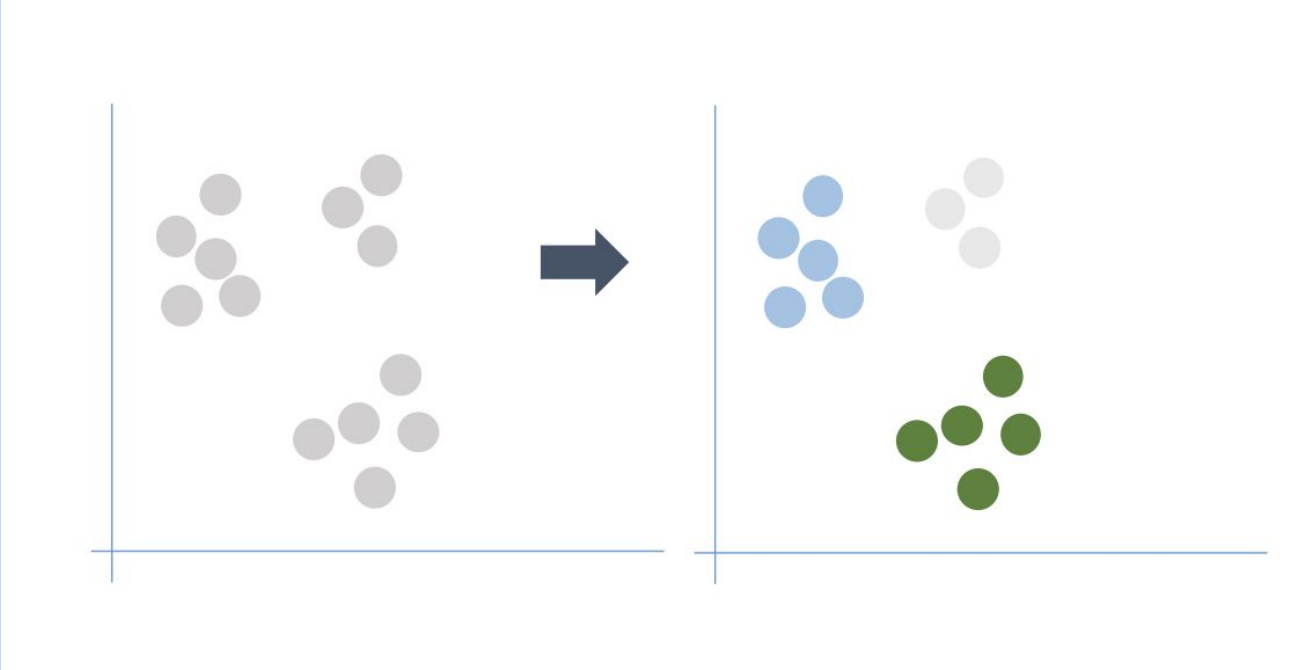
Examples

- Spam vs Non-spam
- Forecasting rainfall
- Recommending movies
- Friend suggestions
- Voice/Instrument separation
- Grouping pictures in phone
- Robot navigation
- Stock market prediction

Examples

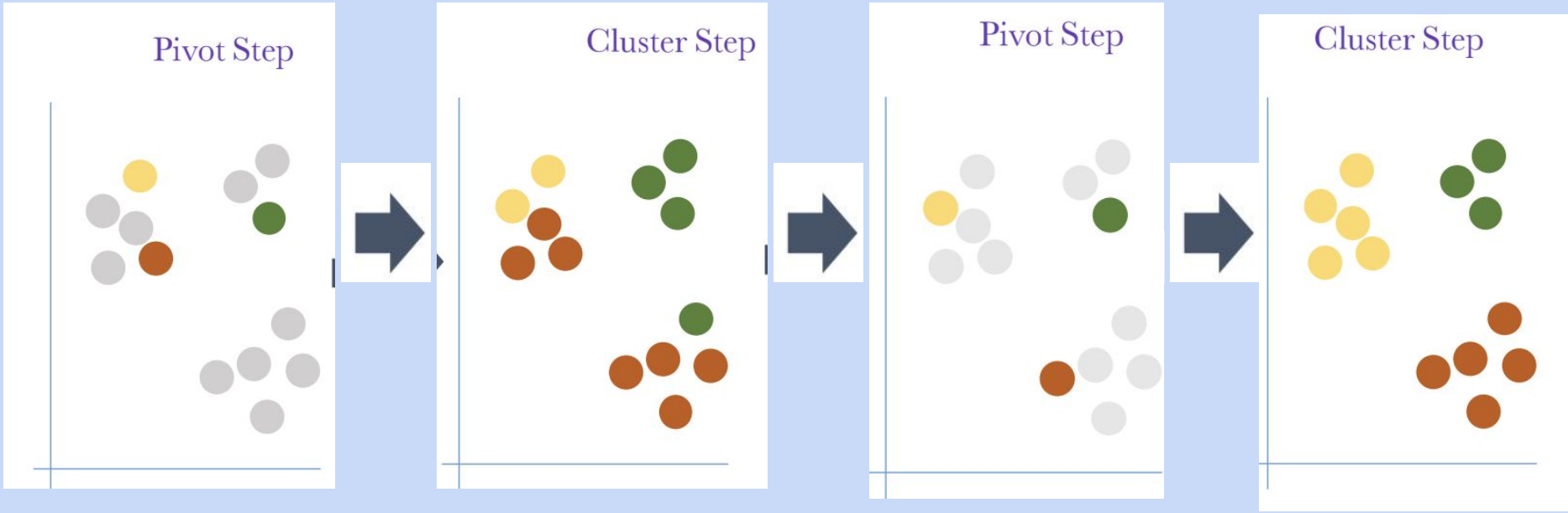
- Spam vs Non-spam – *Binary Classification*
- Forecasting rainfall - *Regression*
- Recommending movies – *Ordinal Classification*
- Friend suggestions – *Link Prediction*
- Voice/Instrument separation – *Unsupervised learning*
- Grouping pictures in phone - *Clustering*
- Robot navigation – *Reinforcement Learning*
- Stock market prediction – *Online learning*

Unsupervised Learning

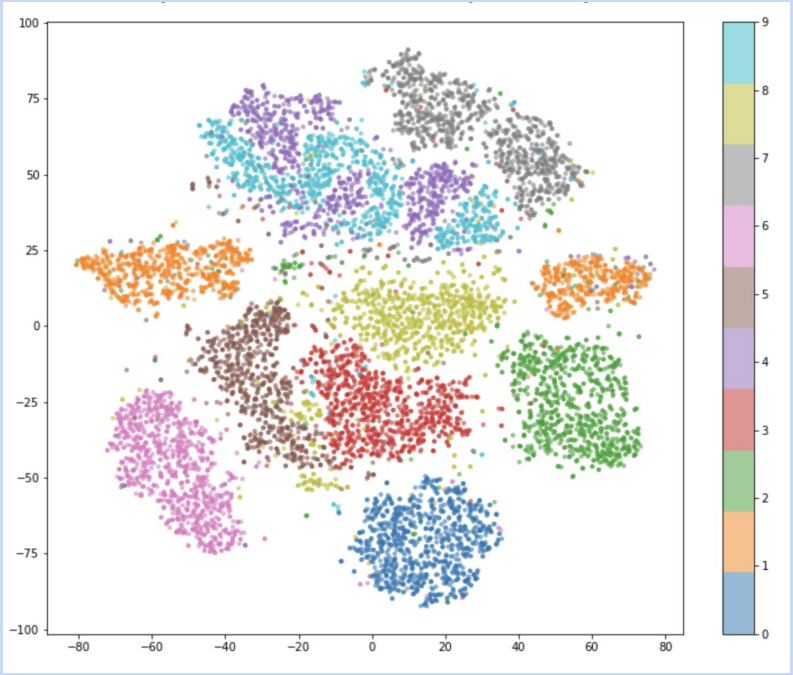


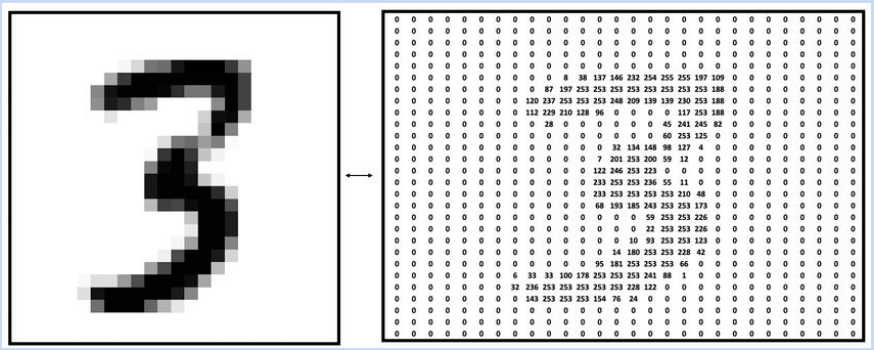
Clustering

Algorithm - K-means

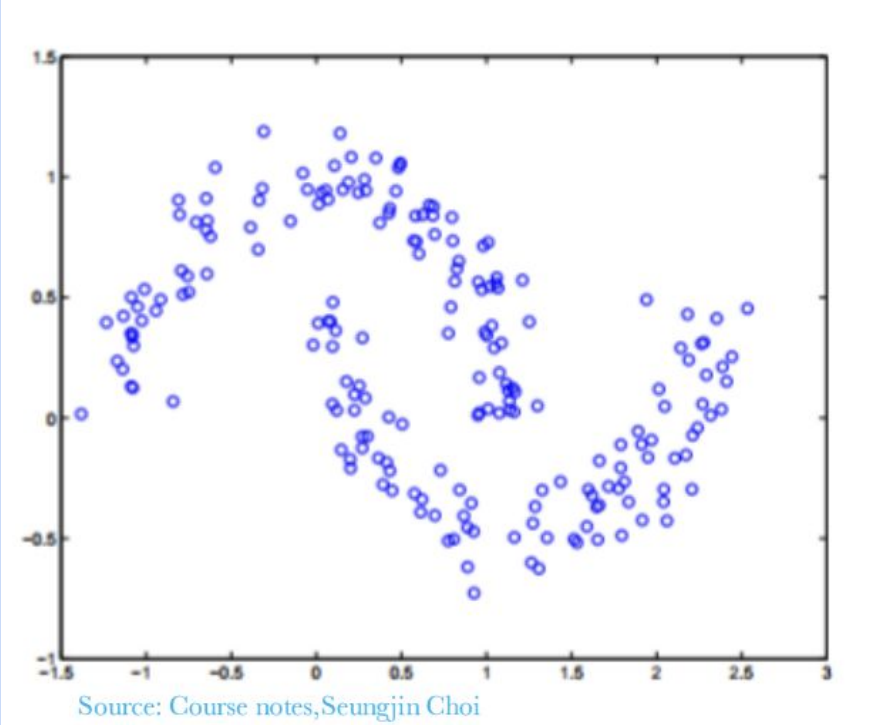


A real world example - MNIST dataset



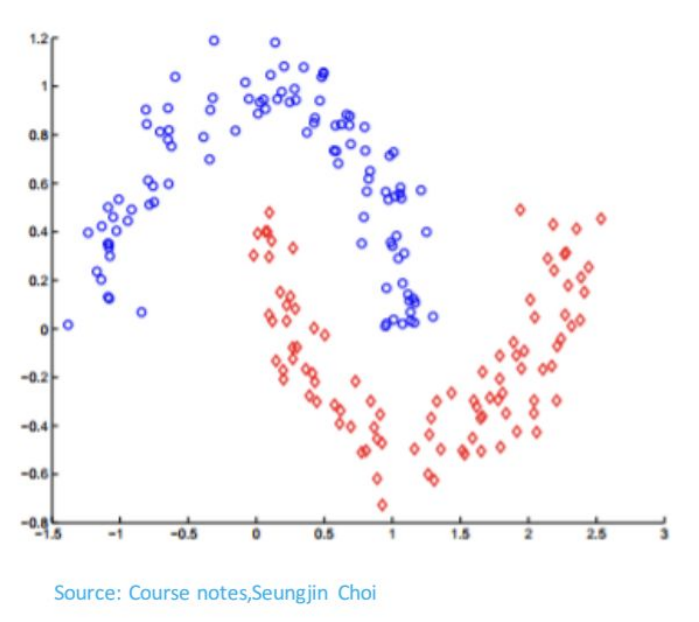


What happens now?

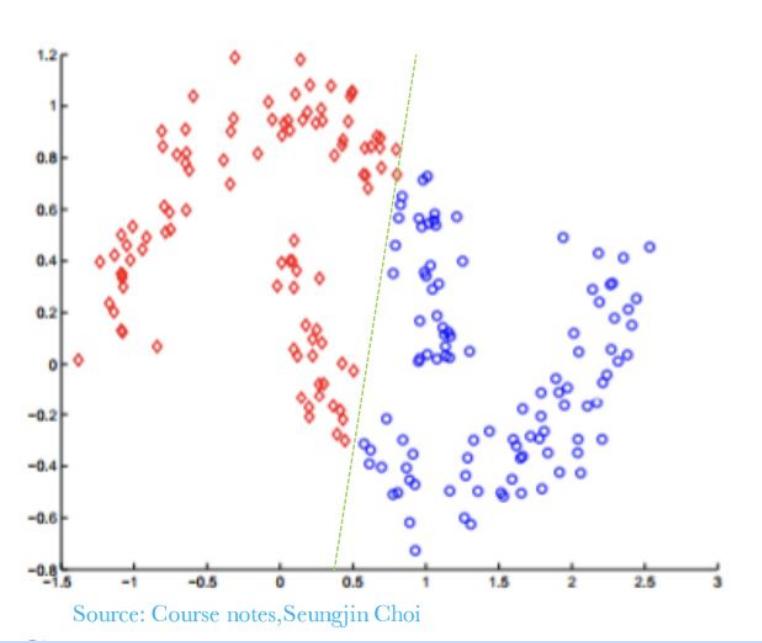


Source: Course notes,Seungjin Choi

Which solution will K-means lead to?



or



Questions for discussion

How will you choose K in K-means?

Can you think of real world example where you can apply K-means?

Can you think of any other technique for clustering?

Coming up

Algorithms for Supervised Learning!