

# Machine Learning

An overview of techniques and an  
application to online games

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# What is Machine Learning?

Field of study that gives computers the ability to learn without being explicitly programmed.

A computer program is said to learn from experience  $E$  with respect to some task  $T$  and some performance measure  $P$  if its performance on  $T$ , as measured by  $P$ , improves with experience  $E$ .

# What is it good for?

- Self-customized programs
  - Amazon, Netflix
- Data mining
  - Used for large data sets
- Programs you can't write by hand
  - Handwriting recognition, Natural Language Processing (NLP)

# Supervised Learning

- Have a dataset for which we know the right answers.

Classification

Regression

- Examples

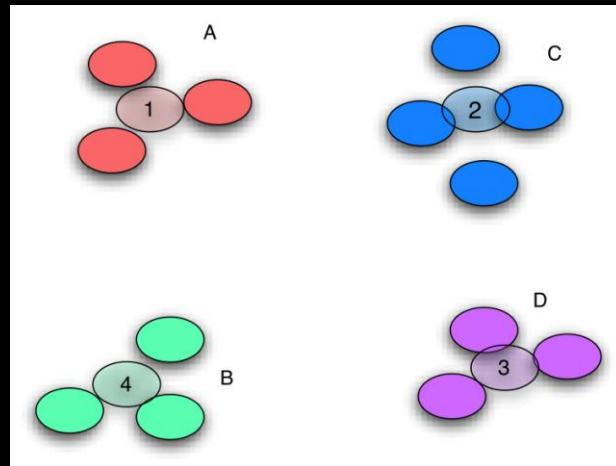
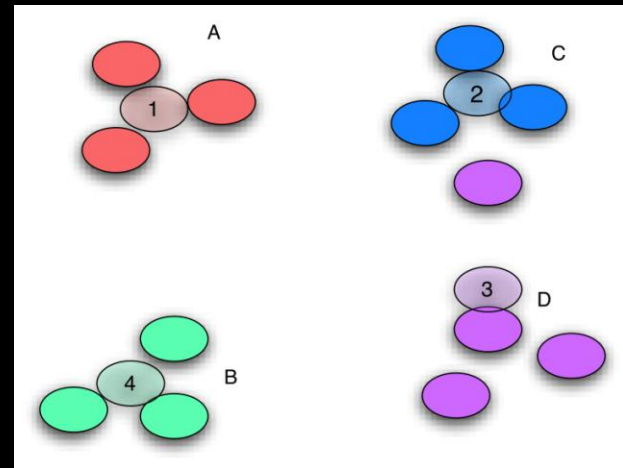
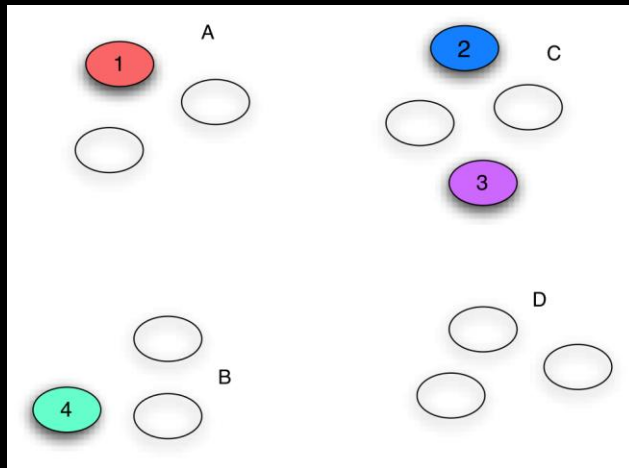
# Unsupervised Learning

- Find structure in data
- Examples

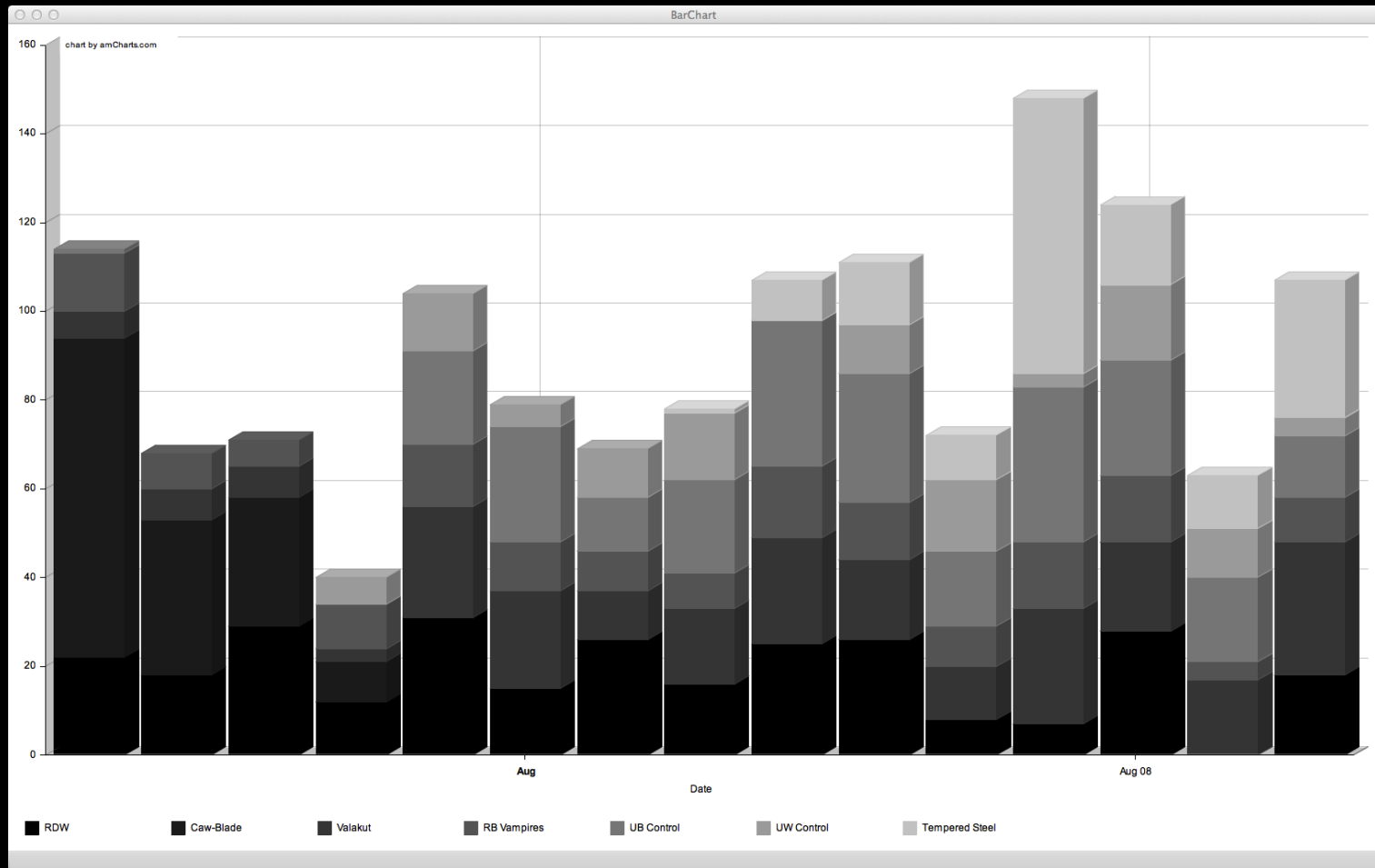
# Applications to Online Games

- Apply to Magic: the Gathering Online
- Player choose cards to use in a deck, and tend to make similar but not identical choices
- Supervised or unsupervised learning can apply
- Clustering lets us associate similar decks to find structure in the data

# Overview of k-means Clustering



# Results



Questions?