

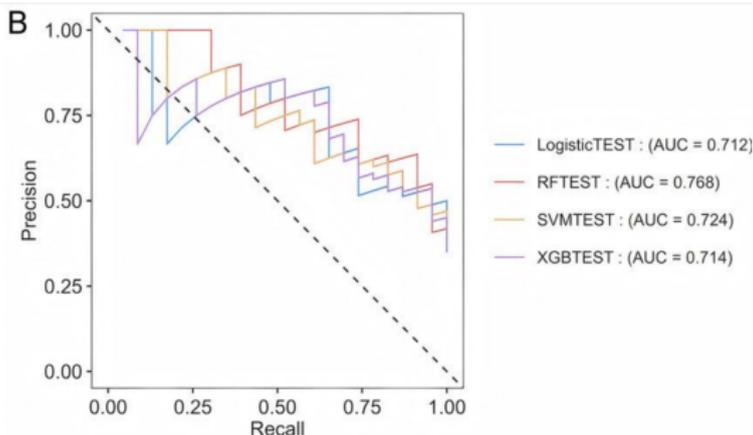
Lecture 16

Unsupervised Learning

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Source: "A machine learning model for non-invasive prediction of advanced liver fibrosis in patients with chronic hepatitis B"



1 Supervised vs. Unsupervised Learning

2 Clustering



1 Supervised vs. Unsupervised Learning

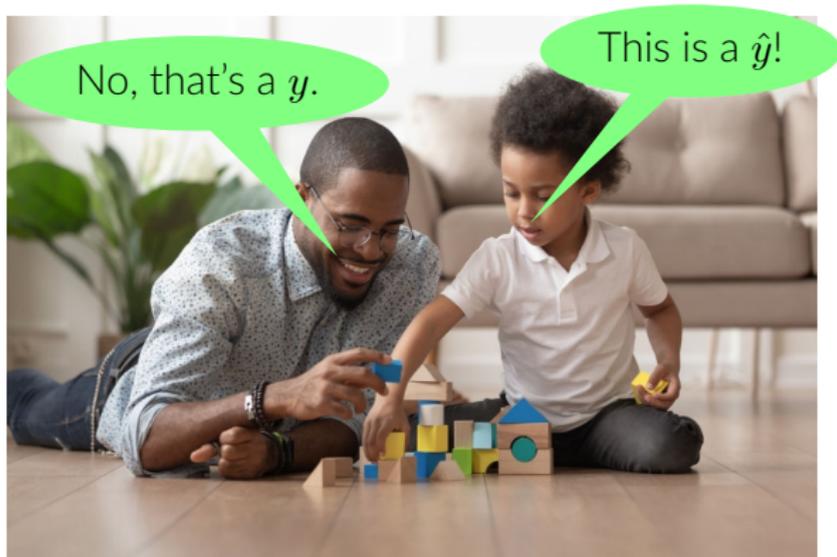
2 Clustering



Supervised Learning

So far, in all the machine learning problems we've looked at, we had training data where the label y was known.

This is called **supervised learning**. Think of a child learning their shapes under the *supervision* of an adult.



Unsupervised Learning

What if we have training data without labels y ?

This is called **unsupervised learning**. It is like a child who has been left to learn about shapes on their own without an adult to guide them.



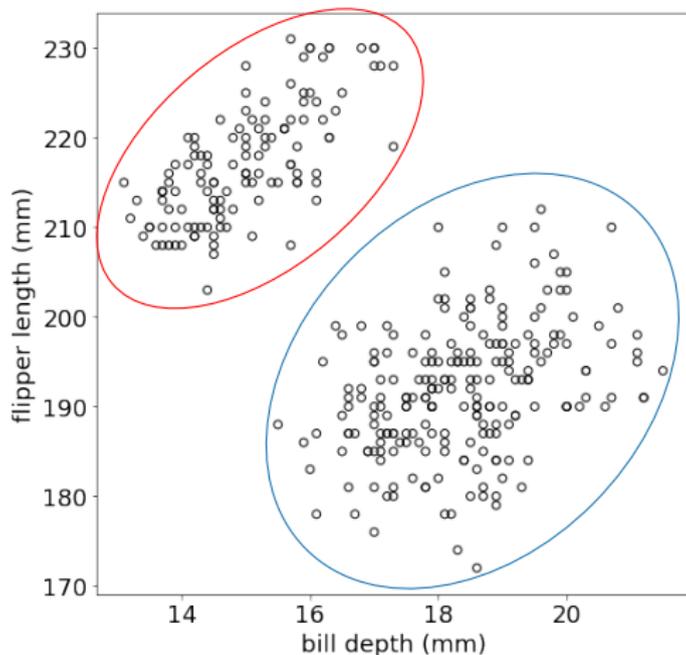
1 Supervised vs. Unsupervised Learning

2 Clustering



Clustering

Clustering is one type of unsupervised learning. The goal is to find groups of similar observations. For example, consider the Palmer penguins data set.



There appear to be at least two distinct types of penguins.



K-Means Clustering

We will explore a specific clustering model, called *k*-means clustering, in a Colab.



Applications of Clustering

- **Ecology:** An ecologist wants to group organisms into types.
- **Market Segmentation:** A business wants to group their customers into types.
- **Language:** A linguist might want to identify different uses of ambiguous words like “set” or “run”.

In section tomorrow, you will explore applications to document clustering and image compression.

