



JOHNS HOPKINS

WHITING SCHOOL
of ENGINEERING

Algorithms for Data Science

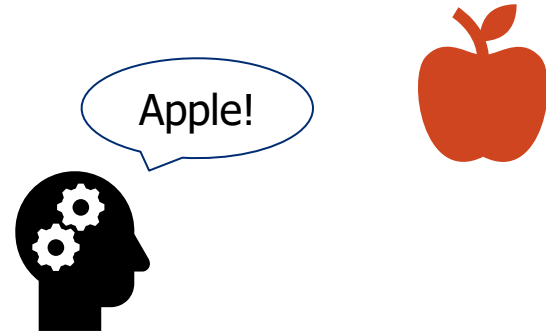
Data Modeling: Supervised Learning

Supervised Learning

How do we teach machines to predict outcomes based on past examples?

Supervised learning leverages labeled data to learn patterns.

- Imaging showing a child a picture of an apple and explicitly telling them it is an apple.
- Over time, they will learn to identify the apples on their own.



How do I Categorize This?

- How do streaming platforms suggest whether a movie is a good fit for you?
- What enables financial institutions to decide if a transaction is fraudulent?
- What system might help an autonomous vehicle recognize a stop sign?
- How do hiring platforms determine which applicants to flag for a job?

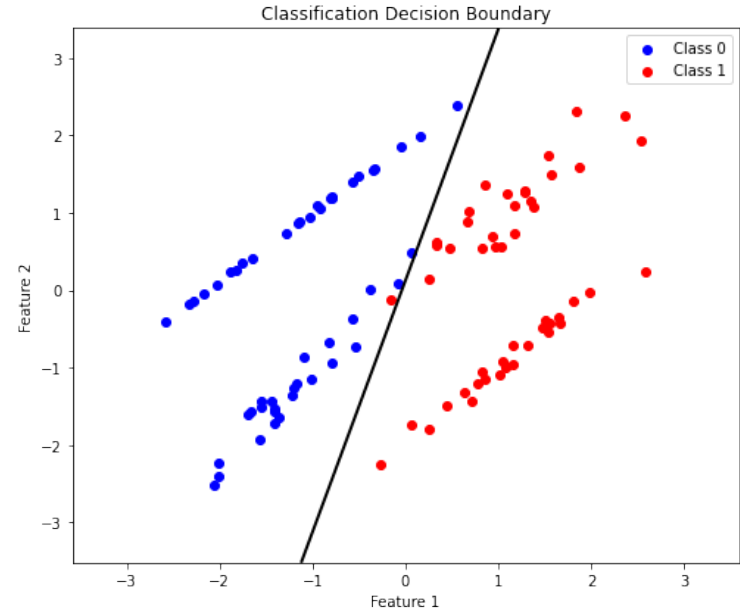
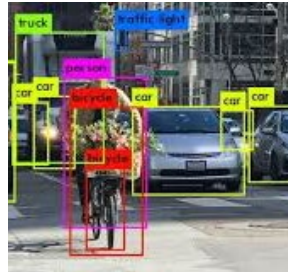
Supervised classification tackles questions where the answers fall into specific categories, guiding automated decisions.

Supervised Learning: Classification

Supervised classification involves predicting discrete labels for input data based on labeled training data.

**Requires
labeled data**

**Predicts
categories**



How do I Predict Continuous Outcomes?

- How do weather apps predict tomorrow's temperature?
- What helps e-commerce platforms estimate the delivery time for your package?
- What enables analysts to forecast stock prices or trends?
- How do doctors predict the progression of a patient's condition?

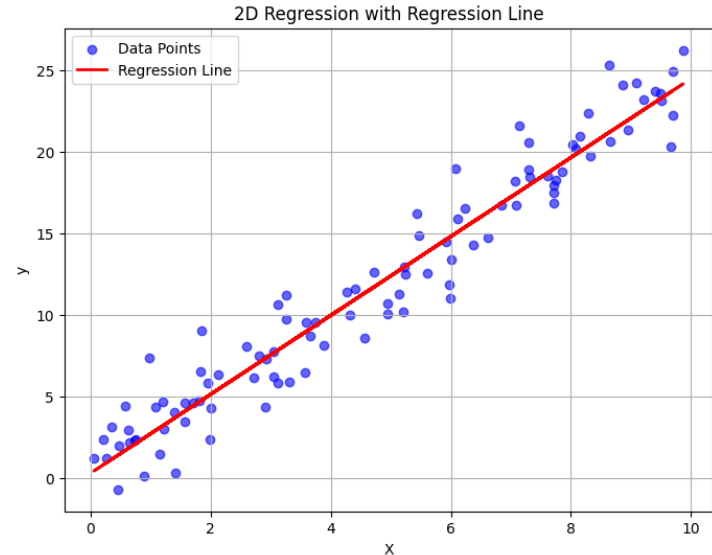
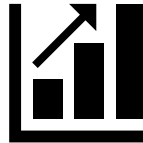
Supervised regression tackles questions where the answers are continuous values, guiding numerical predictions.

Supervised Learning: Regression

Regression predicts continuous values by finding relationships between input features and a target variable.

**Requires
labeled data**

**Predicts
numerical
quantities**



Supervised Learning Activity

Based on what you've learned about supervised learning, think of an example application.

- Guiding questions:
 - "What types of data would it use?"
 - "What problem would it solve?"
 - "Why is classification or regression the right approach for this problem?"





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