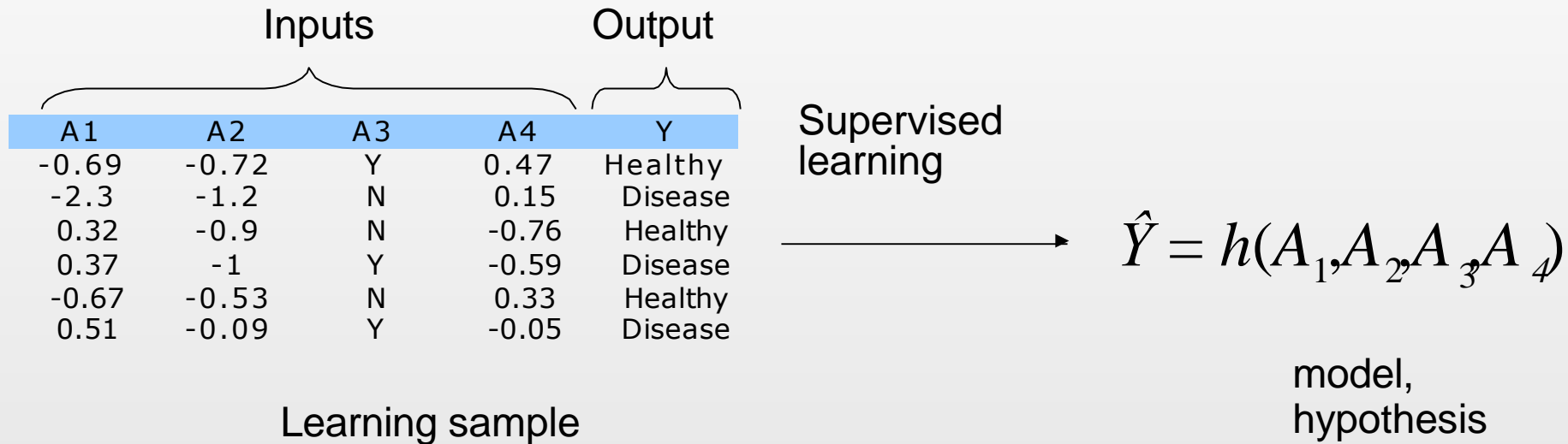


Supervised Machine Learning

Supervised Machine Learning

Supervised learning is an approach to creating artificial intelligence (AI), where a computer algorithm is trained on input data that has been labeled for a particular output. The model is trained until it can detect the underlying patterns and relationships between the input data and the output labels, enabling it to yield accurate labeling results when presented with never-before-seen data.

Supervised learning

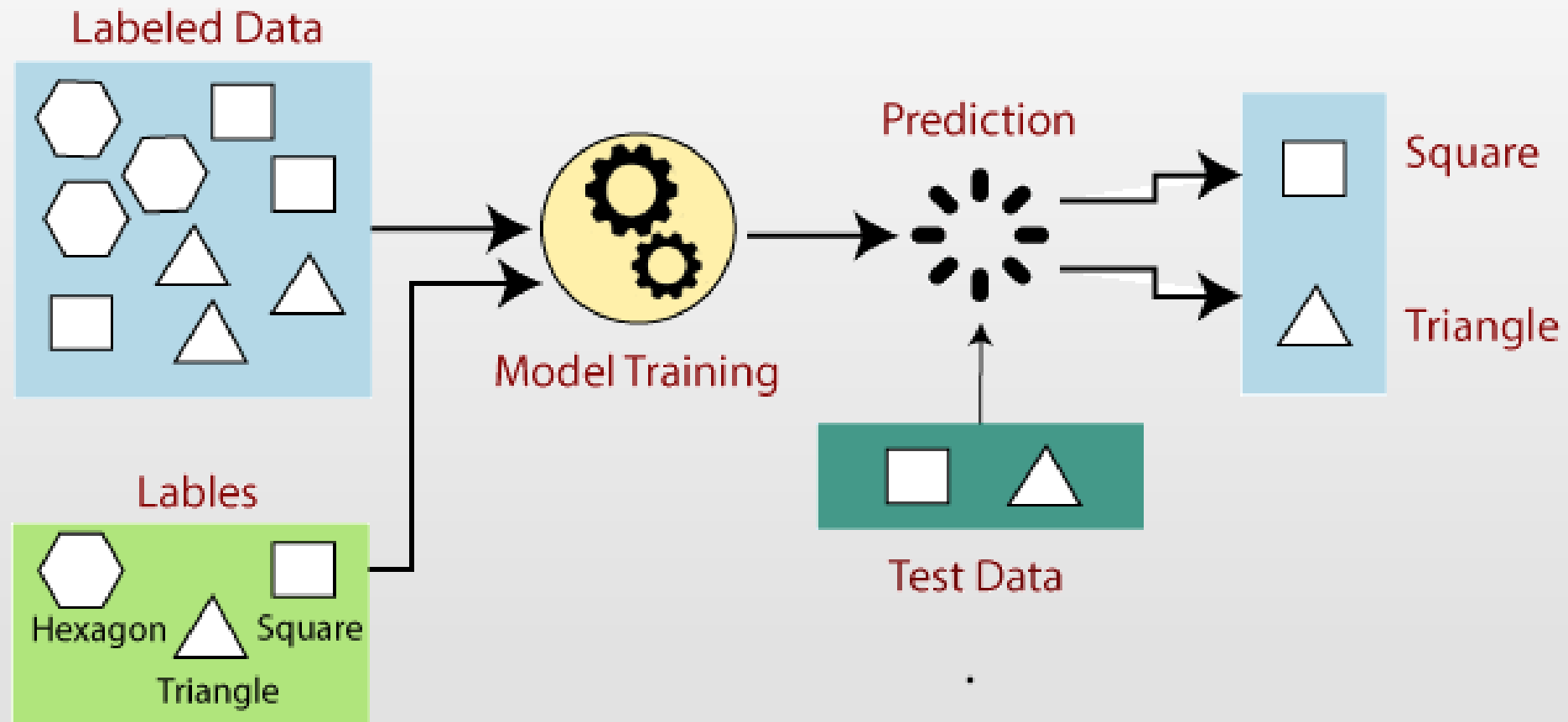


- Goal: from the database (learning sample), find a function h of the inputs that approximates **at best** the output

Symbolic output \Rightarrow *classification* problem, Numerical

- output \Rightarrow *regression* problem

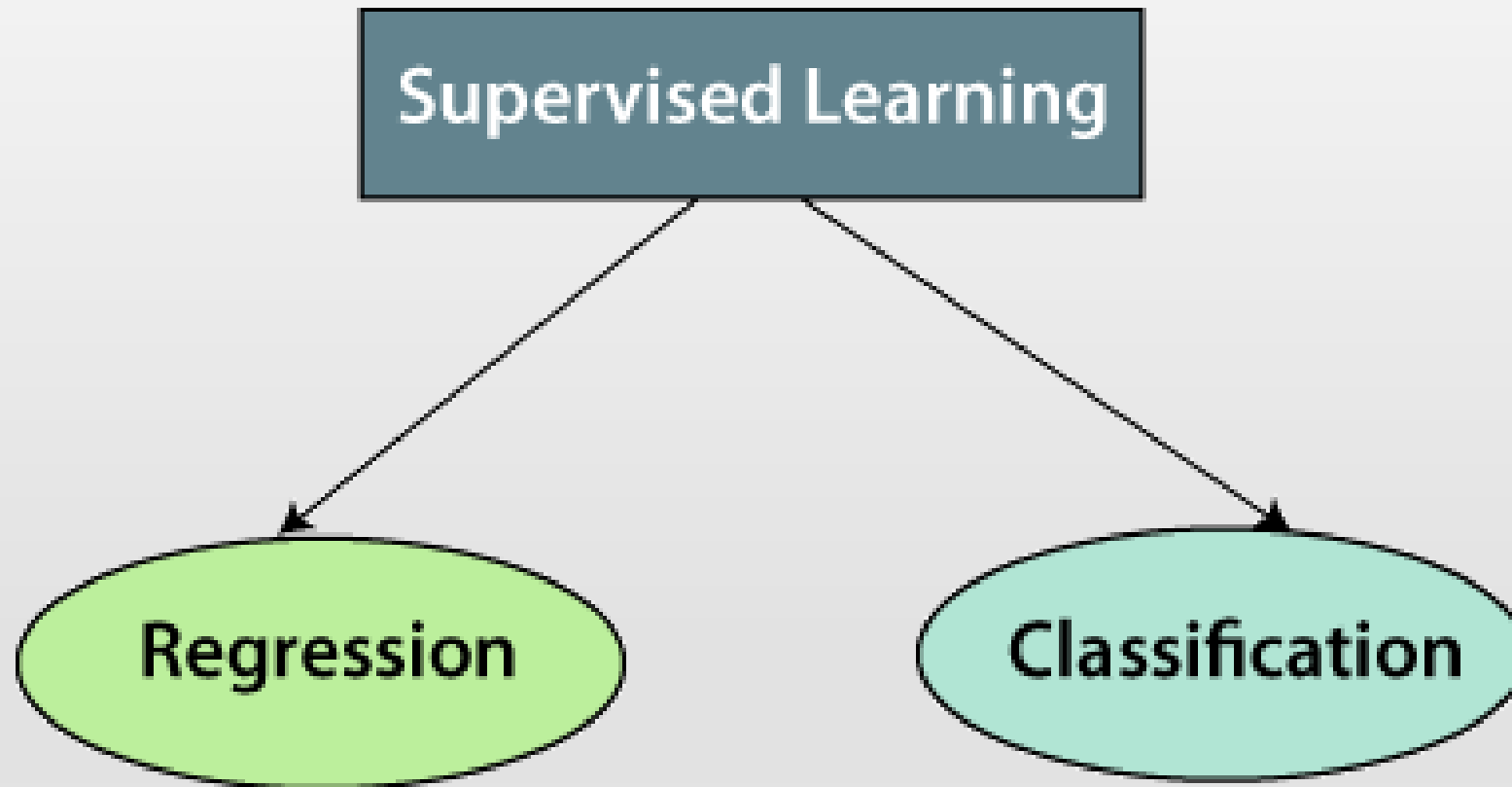
How Supervised learning Works?



Steps involved in Supervised learning

- First Determine the type of training dataset
- Collect/Gather the labelled training data.
- Split the training dataset into training **dataset**, **test dataset**, and **validation dataset**.
- Determine the input features of the training dataset, which should have enough knowledge so that the model can accurately predict the output.
- Determine the suitable algorithm for the model, such as support vector machine, decision tree, etc.
- Execute the algorithm on the training dataset. Sometimes we need validation sets as the control parameters, which are the subset of training datasets.
- Evaluate the accuracy of the model by providing the test set. If the model predicts the correct output, which means our model is accurate.

Types of Supervised learning Algorithms



Regression

- ❑ Used for the prediction of continuous variables
- ❑ Used if there is a relationship between the input variable and the output variable
- ❑ Some popular Regression algorithms which come under supervised learning:
 - Linear Regression
 - Regression Trees
 - Non-Linear Regression
 - Bayesian Linear Regression
 - Polynomial Regression

Classification

☐ When the output variable is categorical

☐ Spam Filtering

✓ Random Forest

✓ Decision Trees

✓ Logistic Regression

✓ Support vector Machines

Advantages

- With the help of supervised learning, the model can predict the output on the basis of prior experiences.
- In supervised learning, we can have an exact idea about the classes of objects.
- Supervised learning model helps us to solve various real-world problems such as **fraud detection, spam filtering**, etc.

Disadvantages

- Supervised learning models are not suitable for handling the complex tasks.
- Supervised learning cannot predict the correct output if the test data is different from the training dataset.
- Training required lots of computation times.
- In supervised learning, we need enough knowledge about the classes of object.