**Supervised Learning Notations and Definitions**

**Notations:**

* x(i)x(i): The input variables or input features (e.g., living area in the housing example).
* y(i)y(i): The output or target variable we are trying to predict (e.g., price).
* (x(i),y(i))(x(i),y(i)): A training example.
* mm: The number of training examples.
* Training SetTraining Set: A list of mm training examples {(x(i),y(i));i=1,…,m}{(x(i),y(i));i=1,…,m}.
* XX: The space of input values.
* YY: The space of output values.
* X=Y=RX=Y=R: In the given example, both input and output values are real numbers.

**Goal:**

* **Learn a Function**: h:X→Yh:X→Y, where h(x)h(x) is a good predictor for the corresponding value of yy.
* **Hypothesis**: The function hh is referred to as a hypothesis.

**Problem Types:**

* **Regression Problem**: Predicting a continuous target variable (e.g., housing price).
* **Classification Problem**: Predicting a discrete target variable (e.g., house or apartment).

**Pictorial Representation:**

* Input xx is mapped to output yy through the hypothesis hh.
* The process involves learning the function hh from the training set to make accurate predictions.

**Conclusion:**

The notation and definitions provided form the foundation for understanding supervised learning problems. By categorizing problems into regression or classification and defining the relationship between inputs and outputs through a hypothesis, supervised learning aims to create predictive models that generalize well from the training data to unseen examples. The clear understanding of these terms and concepts is vital for both implementing algorithms and interpreting results in machine learning.