

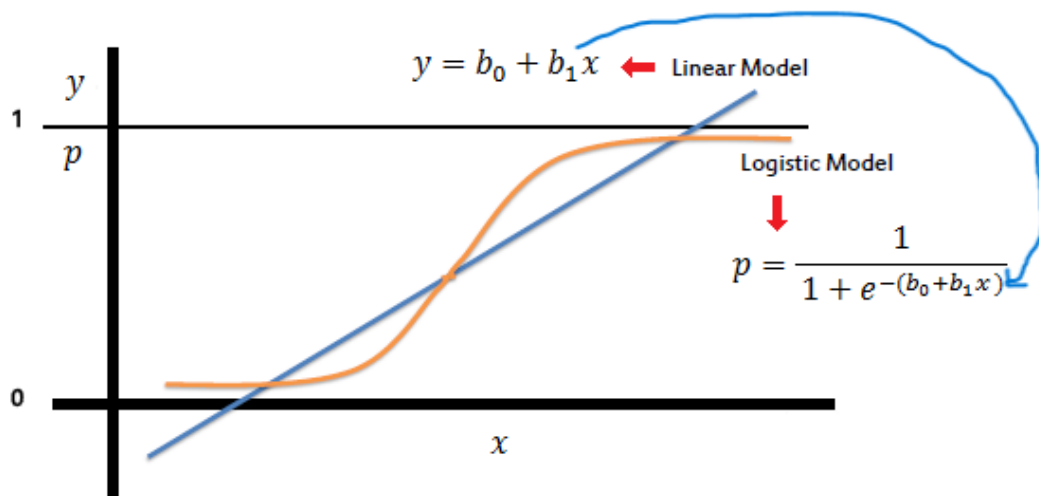
Logistic Regression Example

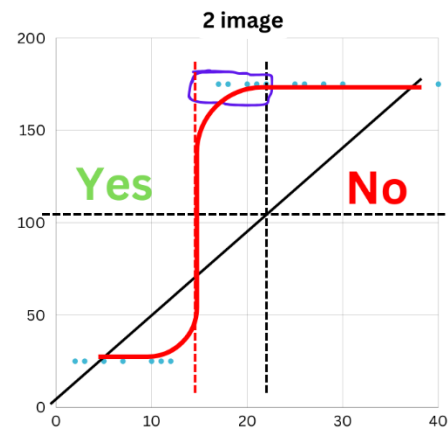
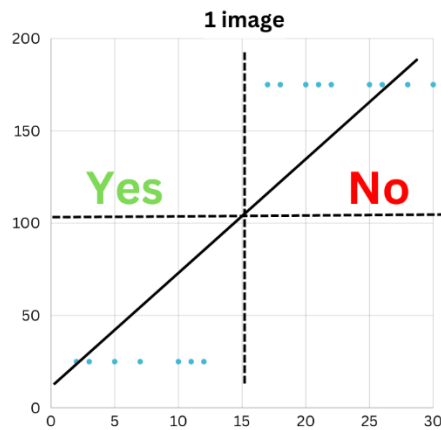
- for binary classification problems
- **Binary Classification:** Logistic regression is primarily used for classification, where the target variable has two possible outcomes (e.g., yes/no, true/false, spam/not spam).
- **Two types**
 - **Binary Classification** involves predicting one of two possible outcomes.
 - **Multiclass Classification** involves predicting one of three or more possible outcomes. In this case, the target variable has more than two distinct classes or categories.
- **Sigmoid Function:** The core of logistic regression is the sigmoid function, which maps any real-valued number into a value between 0 and 1. This is essential for modeling probabilities.

The sigmoid function $\sigma(z)$ is defined as:

$$\sigma(z) = \frac{1}{1 + e^{-z}}$$

where z is the linear combination of input features.





it include long distance point like 2 image (40 point) line change as 2 image black line then more points are represent wrong output(purple box). our prediction can be include big error avoid for this we create sigmoid function(**red line**)

- **Logistic Regression Model**

Logistic Regression Model

The logistic regression model predicts the probability p of the positive class as:

$$p = \sigma(w_0 + w_1x_1 + w_2x_2 + \dots + w_nx_n)$$

where w_0, w_1, \dots, w_n are the model coefficients (weights) and x_1, x_2, \dots, x_n are the feature values.