TECHCRUSH ARTIFICIAL INTELLIGENCE BOOTCAMP

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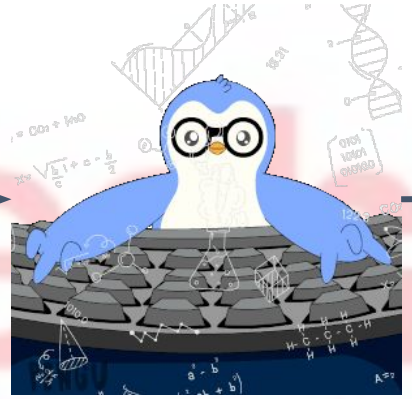
September 1st, 2025

Recap

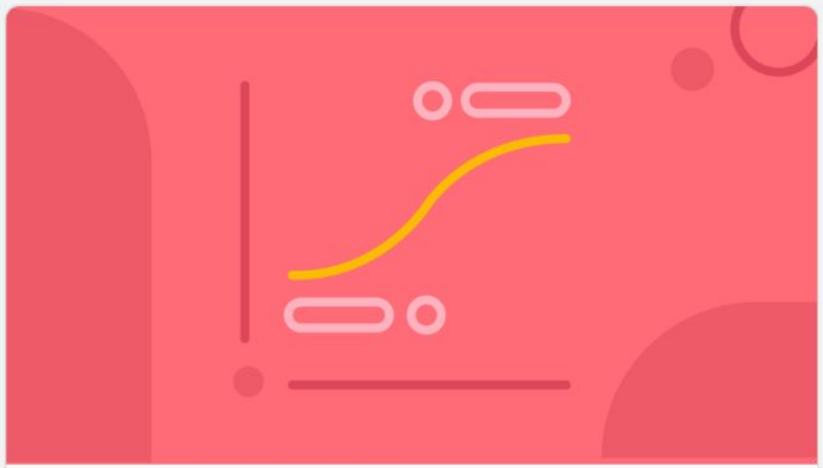


Programming

Linear regression No - Code

Code or No Code, the platform is not as important as the concept

MATLAB



logistic regression is a type of regression that predict the **probability** of a given outcome.

The **probability** of an event is a number between **0 and 1**; the larger the probability, the more likely an event is to occur.

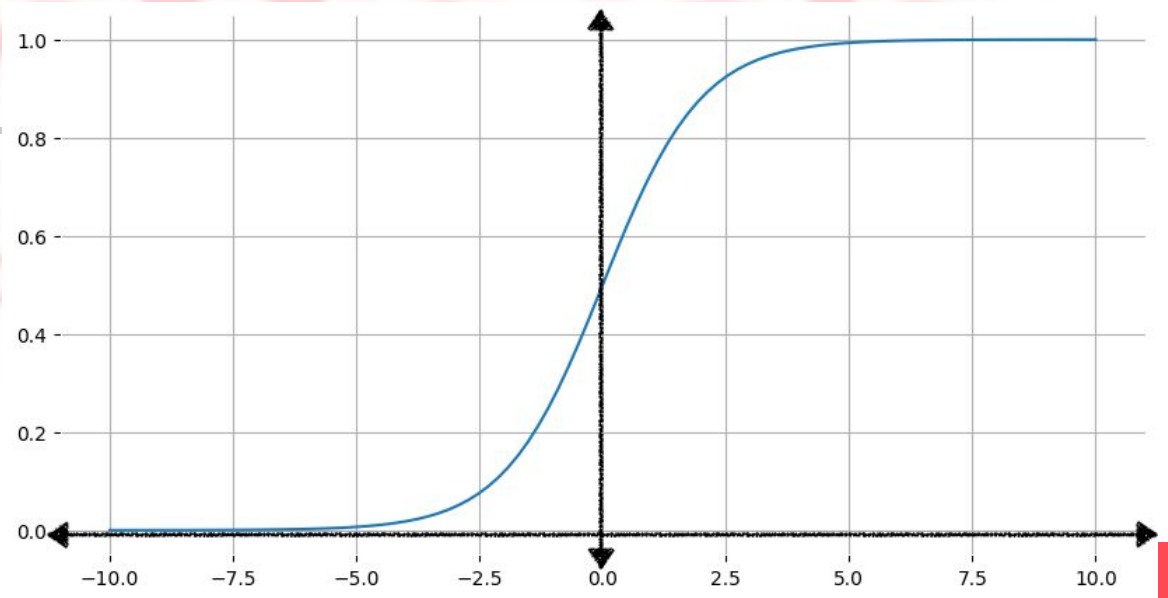
Family of functions called logistic functions

logistic regression

Logistic regression: Sigmoid Function

The standard logistic function, also known as the **sigmoid function** (sigmoid means "s-shaped")

$$f(x) = \frac{1}{1 + e^{-x}}$$

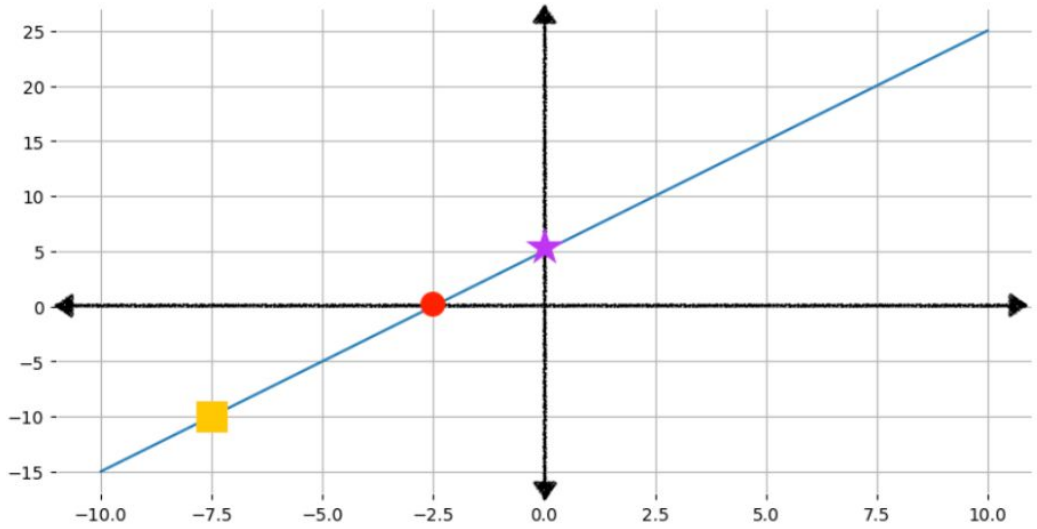


Graphing Online

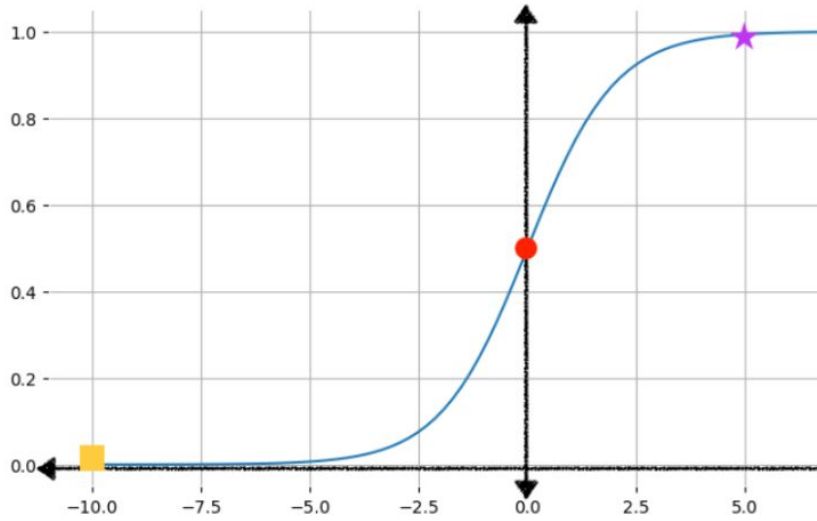
Logistic regression: Sigmoid Function

Transforming linear output using the sigmoid function

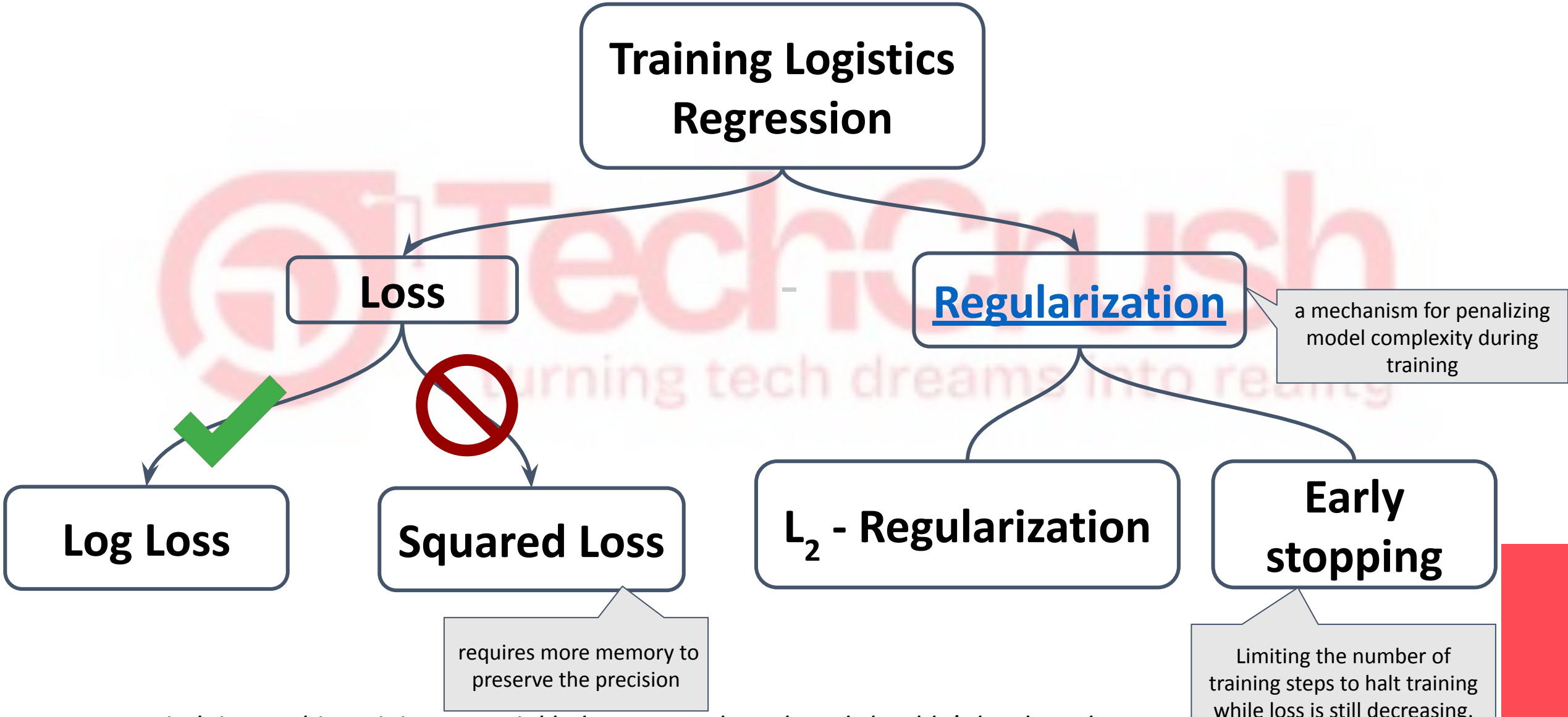
$z = 2x + 5$



$y' = 1 / (1 + e^{-z})$



Logistic regression: Loss and regularization



Logistic regression: Loss and regularization

Log Loss

$$\text{Log Loss} = \sum_{(x,y)\in D} -y\log(y') - (1-y)\log(1-y')$$

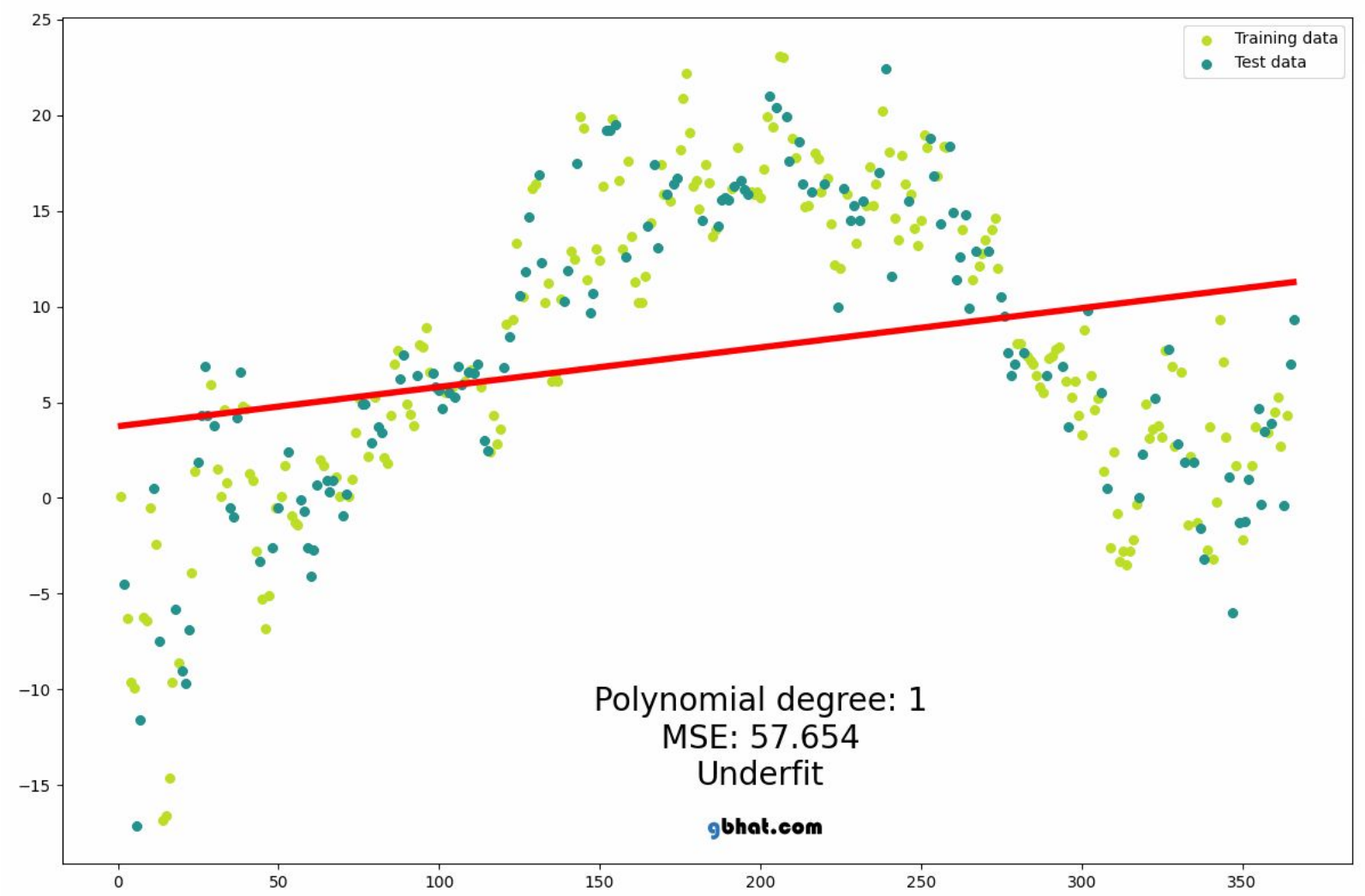
where:

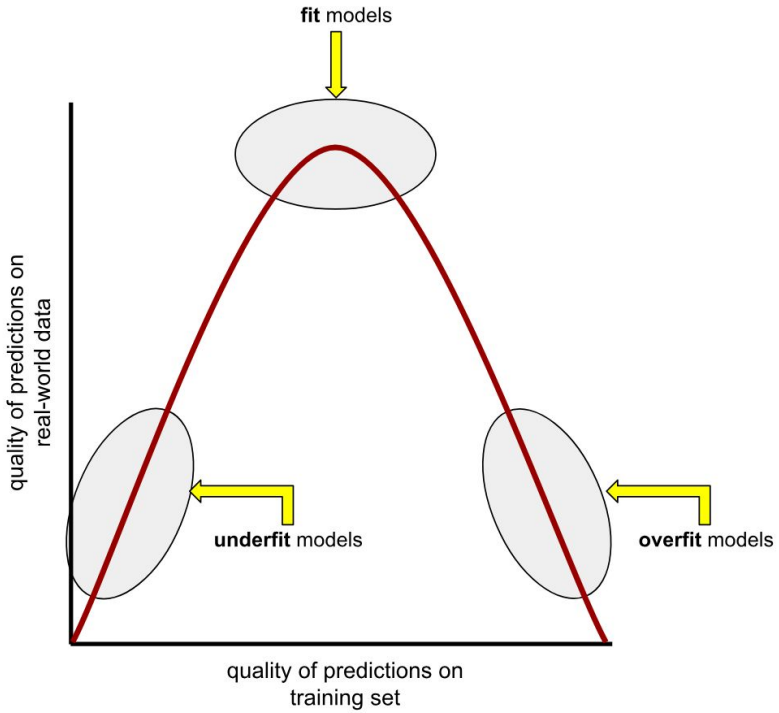
- $(x, y) \in D$ is the dataset containing many labeled examples, which are (x, y) pairs.
- y is the label in a labeled example. Since this is logistic regression, every value of y must either be 0 or 1.
- y' is your model's prediction (somewhere between 0 and 1), given the set of features in x.

$$y = \frac{1}{1+e^{-z}}$$

$$z = \log\left(\frac{y}{1-y}\right)$$

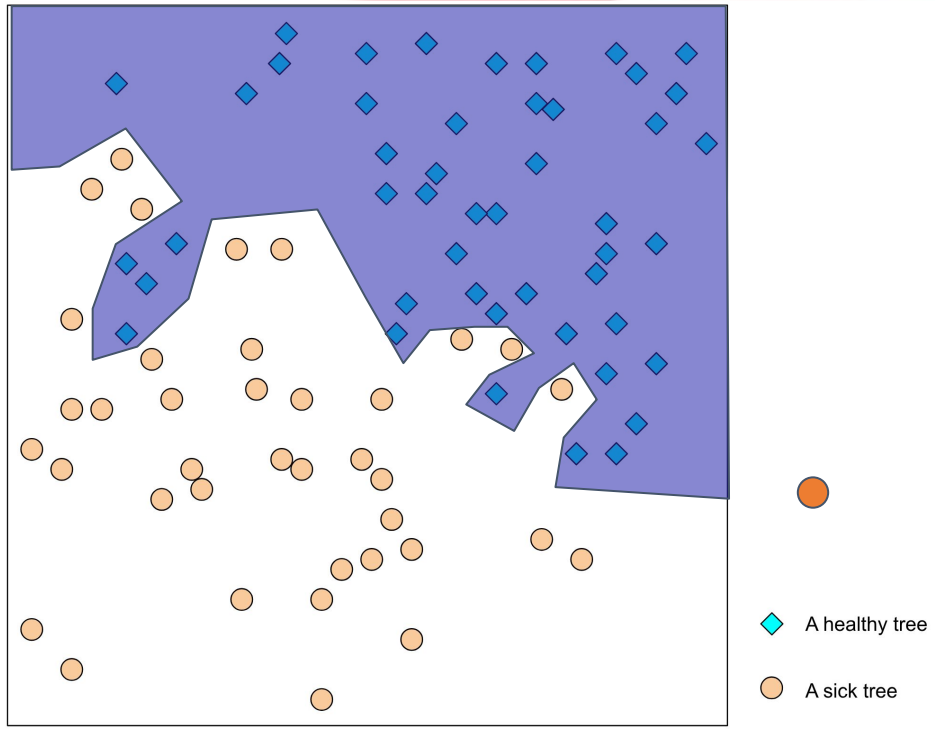
Fitting, overfitting, and underfitting



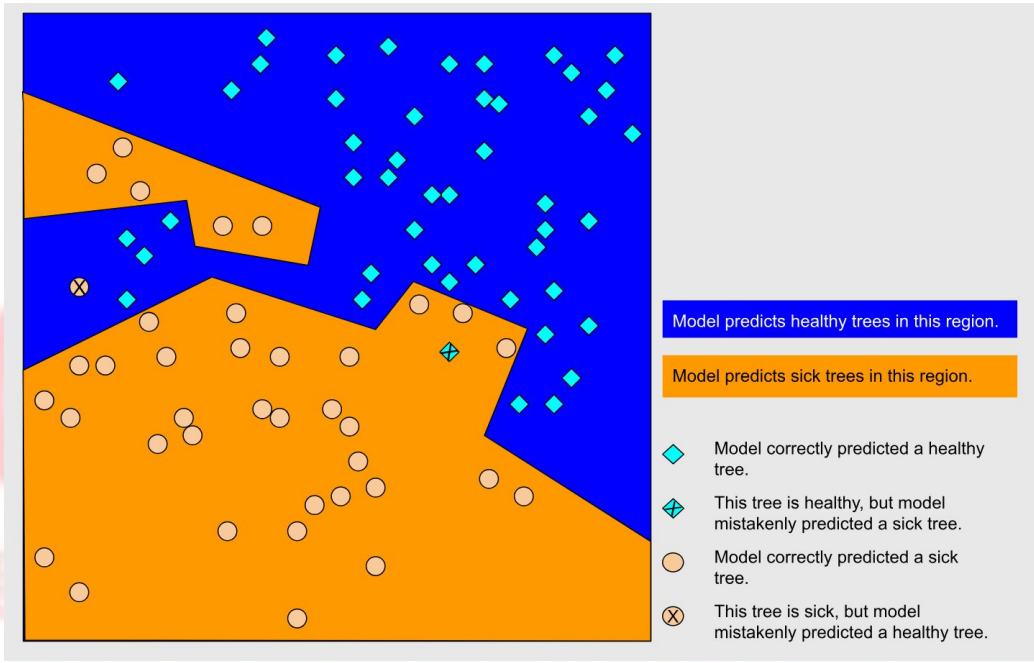


Fitting, overfitting, and underfitting

Overfitting means creating a model that matches (memorizes) the training set so closely that the model fails to make correct predictions on new data.



Training set: locations of healthy and sick trees in a square forest

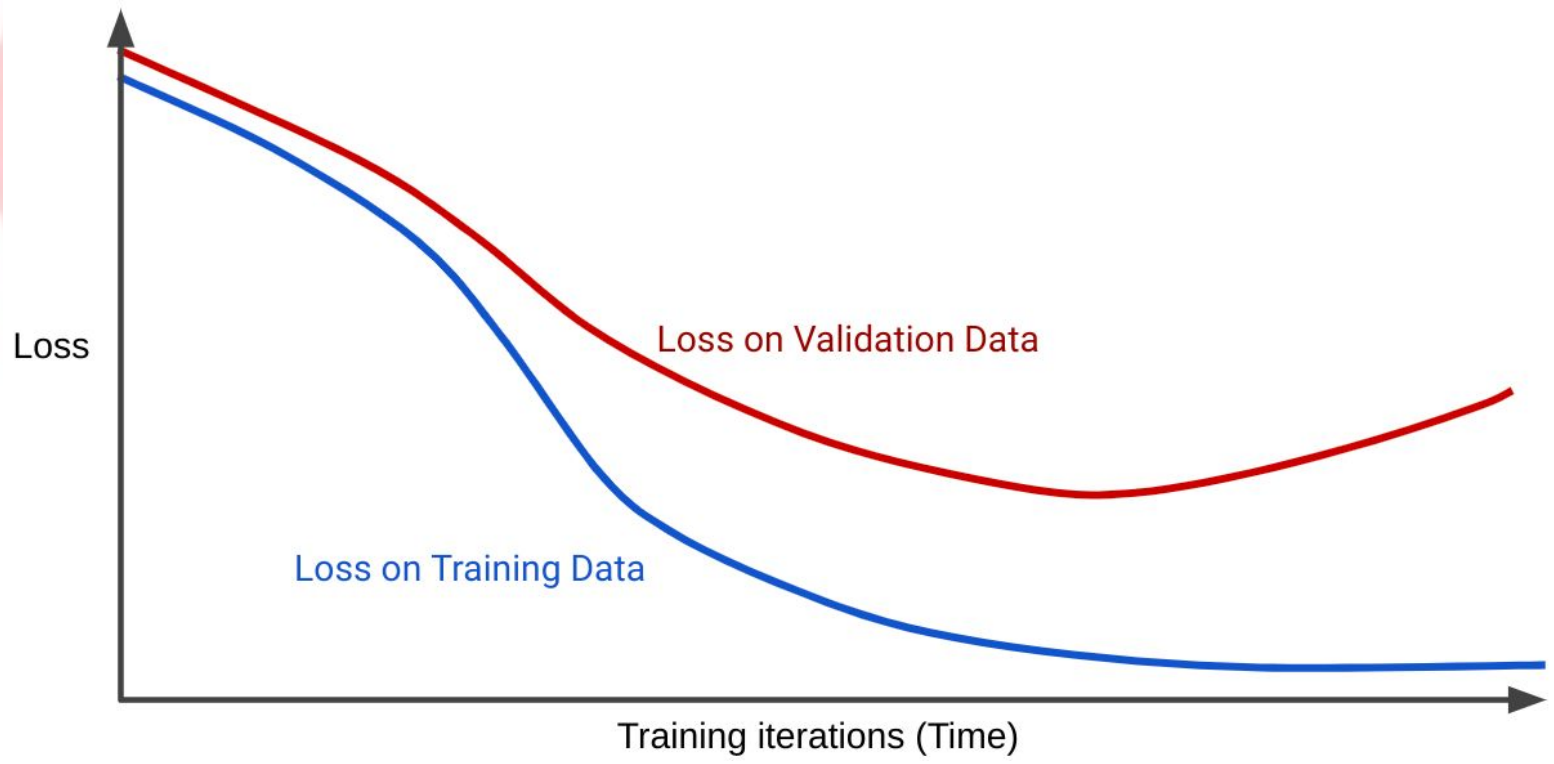


Fitting, overfitting, and underfitting

Overfitting means creating a model that matches (memorizes) the training set so closely that the model fails to make correct predictions on new data.

Detecting overfitting

Generalization is the opposite of overfitting. That is, a model that generalizes well makes good predictions on new data. Your goal is to create a model that generalizes well to new data.



Questions?