

# Linear Perceptron

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## Introduction:

The **Perceptron** is a linear machine learning algorithm for binary classification tasks. It may be considered one of the first and one of the simplest types of artificial neural networks. It is definitely not “deep” learning but is an important building block. Like logistic regression, it can quickly learn a linear separation in feature space for two-class classification tasks, although unlike logistic regression, it learns using the stochastic gradient descent optimization algorithm and does not predict calibrated probabilities.

## Problem Definition and Implementation:

Model takes the dataset and splits it into 70:30 ratio for training-testing, respectively.

The training data set is then passed into the fit function of the Perc class where we learn the weight matrix for our linearly separable data points. Then we predict the classes(0/1) for our testing data using the predict function of the Perc class. We then calculate the accuracy of our model using the accuracy function based on our predicted values(0/1) and the true values given to us for the testing data.

## Observations:

Accuracy of the model: 99.67% on dataset\_LP\_2.csv and 99.27% on dataset\_LP\_1.txt.

Since our model converged on dataset\_LP\_2.csv and not on dataset\_LP\_1.txt, it is more linearly separable than dataset\_LP\_1.txt

## Major limitation of the Perceptron classifier :

Limitation of Perceptron Classifier is that it can only classify linearly separable datasets. In other words Perceptron Algorithm cannot classify non-linear data points.

