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Introduction to Principal Component Analysis (PCA)

Prev Tutorial: **Support Vector Machines for Non-Linearly Separable Data**

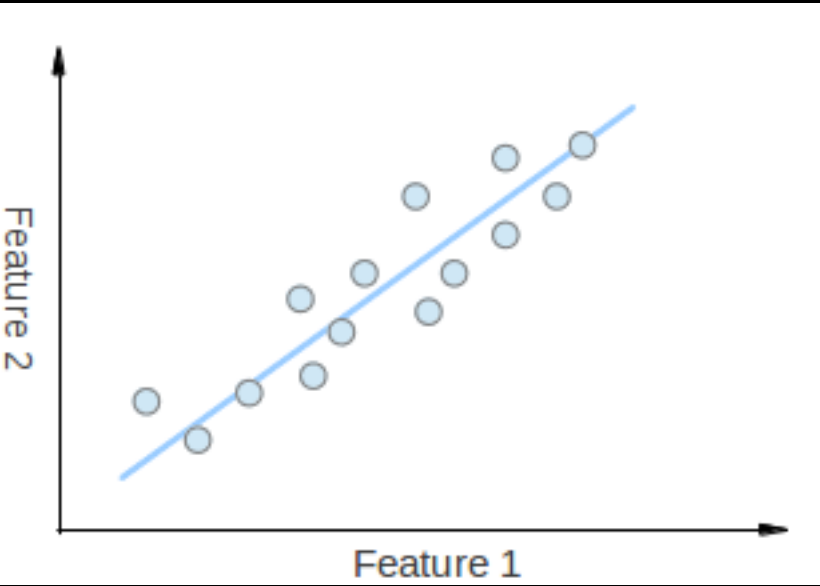| Original author	Theodore Tsesmelis
Compatibility	OpenCV >= 3.0

Goal

In this tutorial you will learn how to:

- Use the OpenCV class **cv::PCA** to calculate the orientation of an object.

What is PCA?

Principal Component Analysis (PCA) is a statistical procedure that extracts the most important features of a dataset.

Consider that you have a set of 2D points as it is shown in the figure above. Each dimension corresponds to a feature you are interested in. Here some could argue that the points are set in a random order. However, if you have a better look you will see that there is a linear pattern (indicated by the blue line) which is hard to dismiss. A key point of PCA is the Dimensionality Reduction. Dimensionality Reduction is the process of reducing the number of the dimensions of the given dataset. For example, in the above case it is possible to approximate the set of points to a single line and therefore, reduce the dimensionality of the given points from 2D to 1D.