Implementing Independent Component Analysis (ICA)

Other useful dimensionality reduction techniques that are closely related to PCA are provided by scikit-learn, but not OpenCV. We mention them here for the sake of completeness. **Independent Component Analysis (ICA)** performs the same mathematical steps as PCA, but it chooses the components of the decomposition to be as independent as possible from each other.

In scikit-learn, ICA is available from the `decomposition` module:

```
In [8]: from sklearn import decomposition
In [9]: ica = decomposition.FastICA()
```

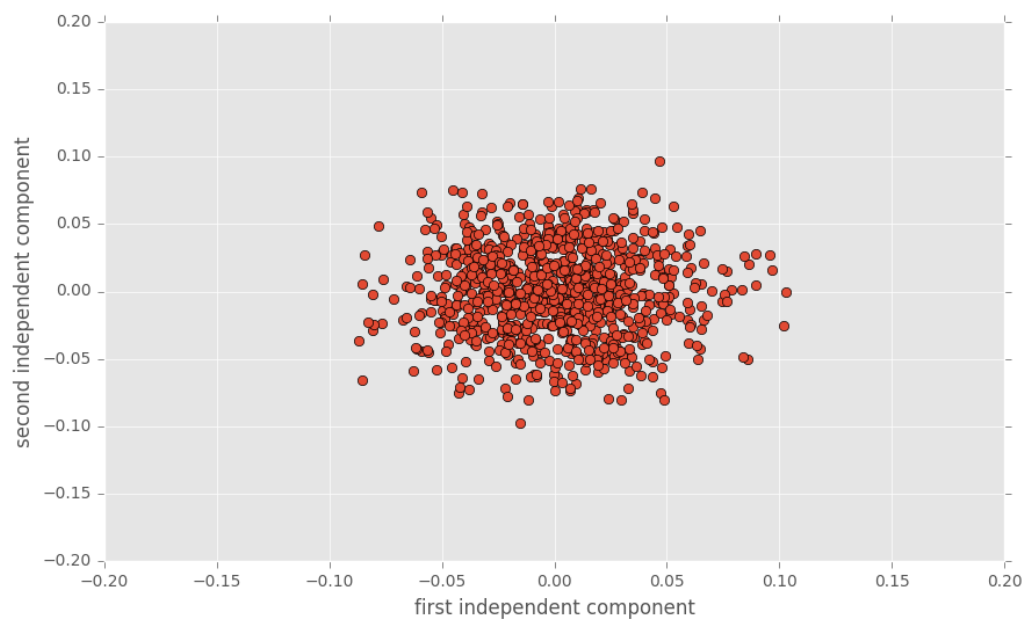As seen before, the data transformation happens in the function `fit_transform`:

```
In [10]: X2 = ica.fit_transform(X)
```

In our case, plotting the rotated data leads to a similar result as achieved with PCA earlier:

```
In [11]: plt.plot(X2[:, 0], X2[:, 1], 'o')
...       plt.xlabel('first independent component')
...       plt.ylabel('second independent component')
...       plt.axis([-0.2, 0.2, -0.2, 0.2])
Out[11]: [-0.2, 0.2, -0.2, 0.2]
```

This can be seen in the following plot:

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