MPUM3v2

June 14, 2018

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In [6]: from sklearn.datasets import load_iris
        from sklearn.preprocessing import StandardScaler
        from matplotlib import pyplot as plt
        import numpy as np

        iris = load_iris()
        X = iris.data
        y = iris.target

        target_names = iris.target_names
        print(target_names)

        X_std = StandardScaler().fit_transform(X)

        mean_vec = np.mean(X, axis=0)

        mean_vec = np.mean(X_std, axis=0)
        #cov_mat = (X_std - mean_vec).T.dot((X_std - mean_vec)) / (X_std.shape[0]-1)

        cov_mat = np.cov(X_std.T)
        eig_vals, eig_vecs = np.linalg.eig(cov_mat)
        eig_pairs = [(np.abs(eig_vals[i]), eig_vecs[:,i]) for i in range(len(eig_vals))]
        eig_pairs.sort(key=lambda x: x[0], reverse=True)

        tot = sum(eig_vals)
        var_exp = [(i / tot)*100 for i in sorted(eig_vals, reverse=True)]
        cum_var_exp = np.cumsum(var_exp)
        matrix_w = np.hstack((eig_pairs[0][1].reshape(4,1),
                              eig_pairs[1][1].reshape(4,1)))


        X_rr = X_std.dot(matrix_w)
        print(X_rr.shape)
        colors = ['navy', 'turquoise', 'darkorange']
        plt.figure(figsize=(8, 6))
        for color, i, target_name in zip(colors, [0, 1, 2], target_names):
            plt.scatter(X_rr[y == i, 0], X_rr[y == i, 1], color=color,
                        label=target_name)
        plt.xlabel('Principal Component 1')
        plt.ylabel('Principal Component 2')
        plt.legend(loc='lower center')
        plt.tight_layout()
        plt.savefig('PREDI3.png', format='png', dpi=1200)
        plt.show()
```

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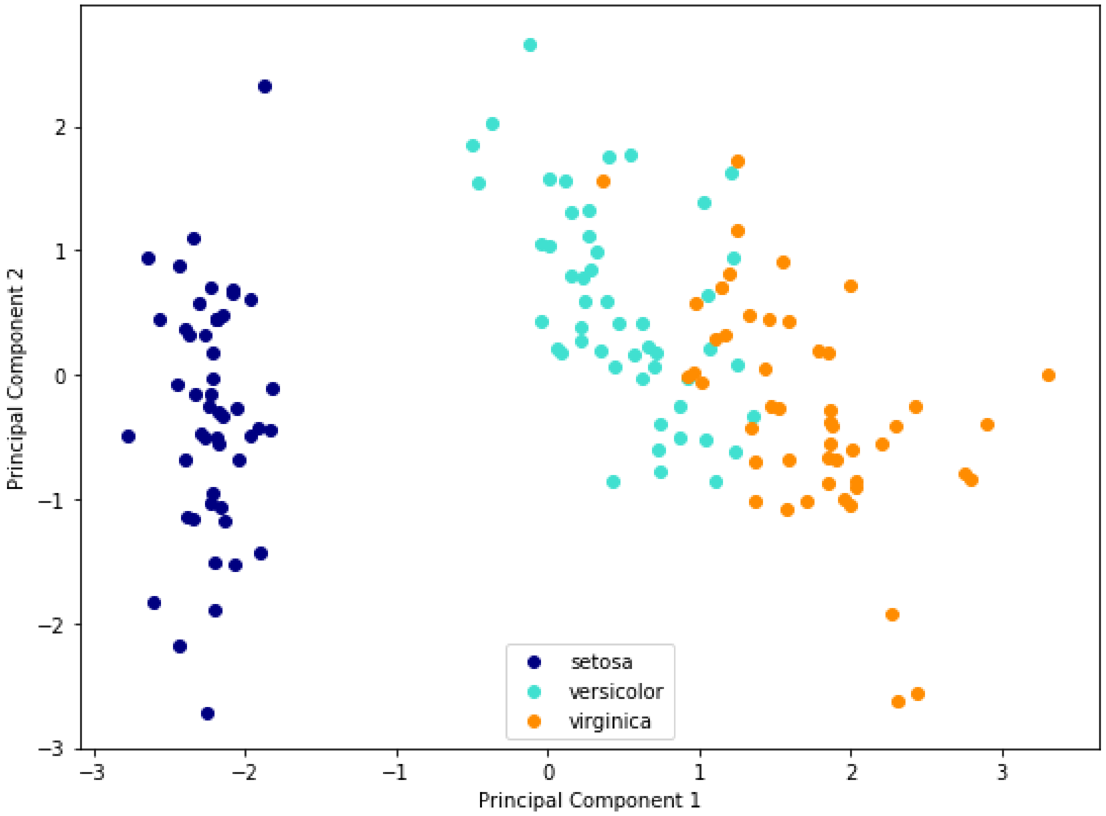
['setosa' 'versicolor' 'virginica']
(150, 2)
```



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In [5]: plt.figure(figsize=(6, 4))
        plt.bar(range(4), var_exp, alpha=0.5, align='center')
        plt.ylabel('Explained variance')
        plt.xlabel('Principal components')
        plt.legend(loc='best')
        plt.tight_layout()
```

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No handles with labels found to put in legend.
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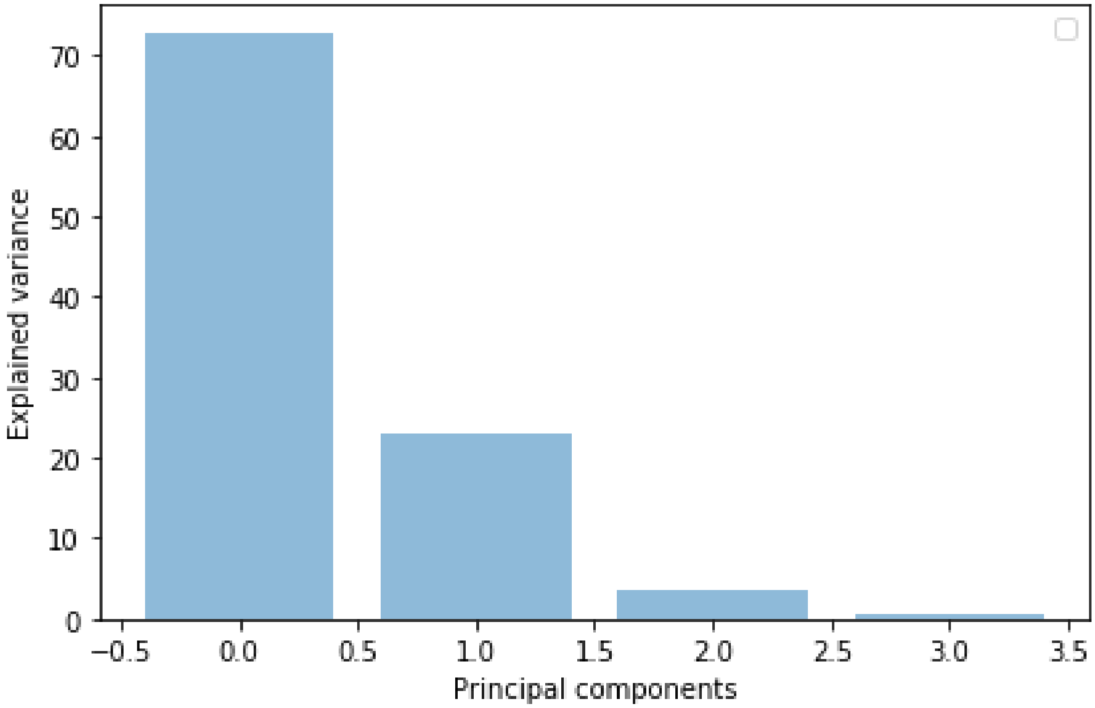
70
60
50
40
30
20
10
0
Explained variance
−0.5
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
Principal components