outliers_part_two

January 26, 2019

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In [8]: # OneClassSVM -- better than EllipticEnvelope
        # Can find all outliters
        from sklearn.decomposition import PCA
        from sklearn import svm
        from sklearn.datasets import load_boston
        import numpy as np
        from sklearn import preprocessing

        boston = load_boston()
        continous_variables = [n for n in range(boston.data.shape[1]) if n!=3]
        normalized_data = preprocessing.StandardScaler().fit_transform(boston.data[:,continous_
        # we won't visualize first 5 components
        pca = PCA(n_components=5)
        Zscore_components = pca.fit_transform(normalized_data)

        outliers_fraction = 0.02
        nu_estimate = 0.95 * outliers_fraction + 0.05
        machine_learning = svm.OneClassSVM(kernel='rbf', gamma=1.0/len(normalized_data), degree
        machine_learning.fit(normalized_data)

        detection = machine_learning.predict(normalized_data)

        outliers = np.where(detection ==-1)
        regular = np.where(detection ==1)
```

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In [9]: # vizualization
        from matplotlib import pyplot as plt
        vtot = "Variation explained in PCA" +  str(round(np.sum(pca.explained_variance_ratio_)
        for r in range(1,5):
            in_points = plt.scatter(Zscore_components[regular,0],
                                    Zscore_components[regular,r], c='blue', alpha=0.8,s=60,
                                    marker='o', edgecolors='white')
            out_points = plt.scatter(Zscore_components[outliers,0],
                                    Zscore_components[outliers,r], c='red', alpha=0.8,s=60,
                                    marker='o', edgecolors='white')
            plt.legend((in_points,out_points), ("Regular","Outliers"),scatterpoints=1, loc="be
            plt.xlabel('Component nr 1 (%s)' % str(round(pca.explained_variance_ratio_[0],3)))
plt.ylabel('Component nr %s (%s)' % (r+1, str(round(pca.explained_variance_ratio_[
plt.xlim([-7,7])
plt.ylim([-6,6])
plt.title(vtot)
plt.show()
```
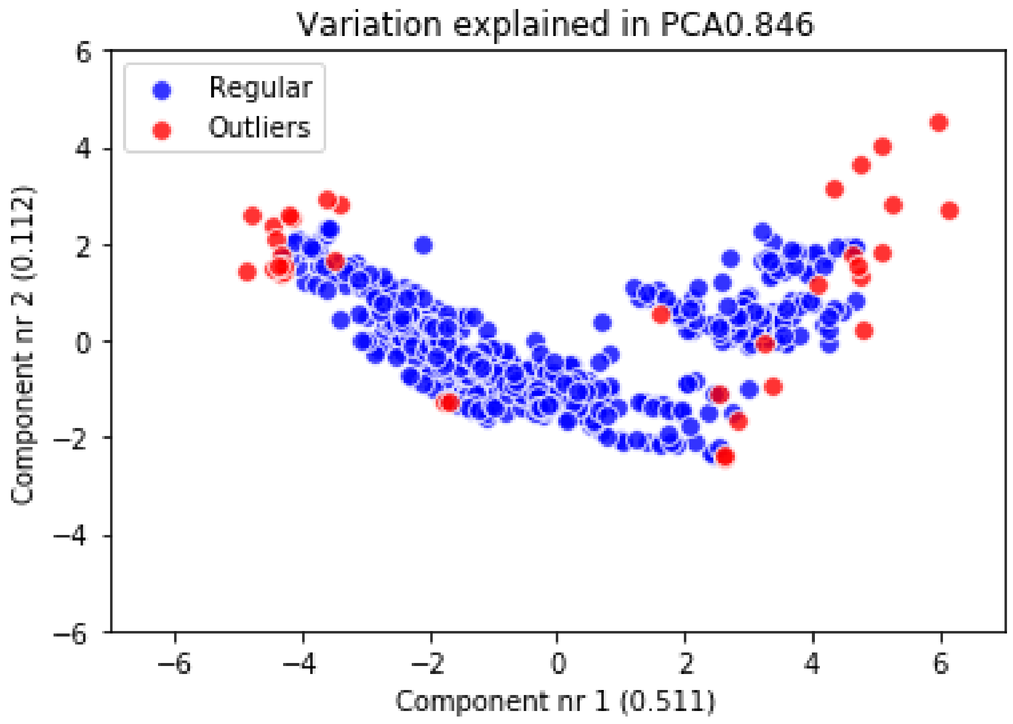
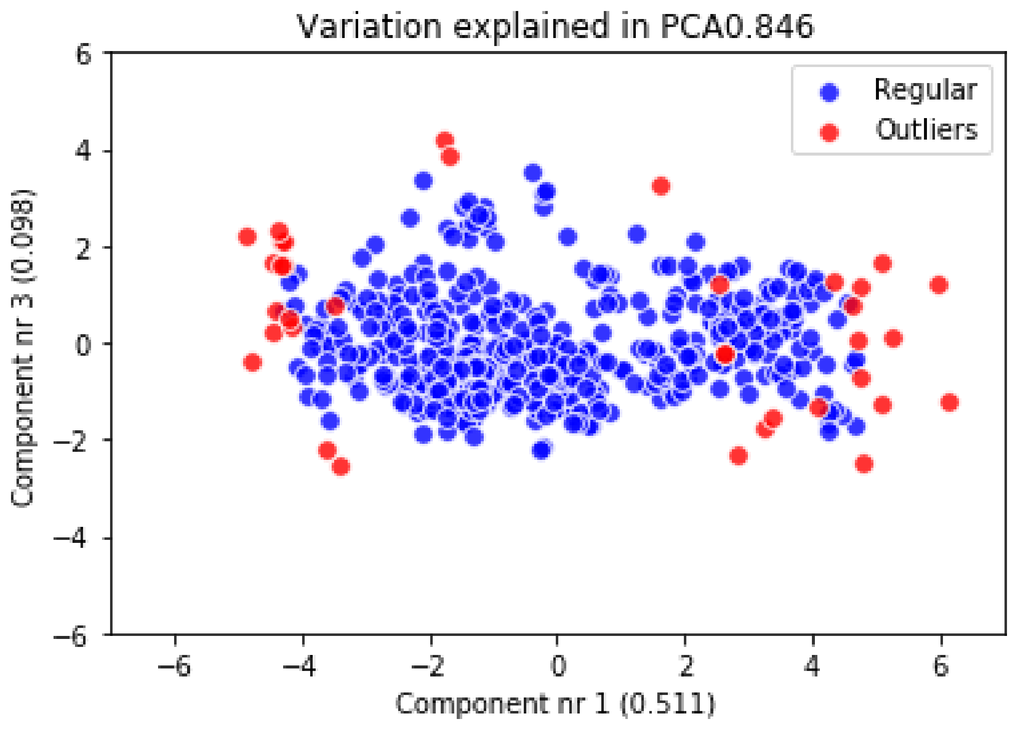
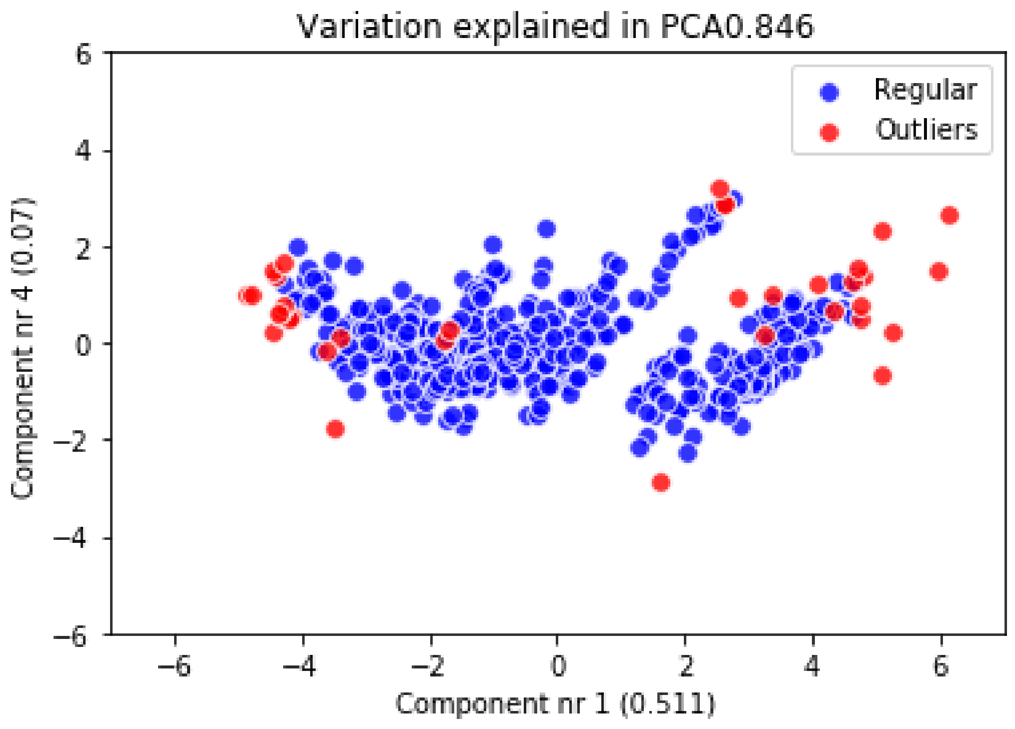
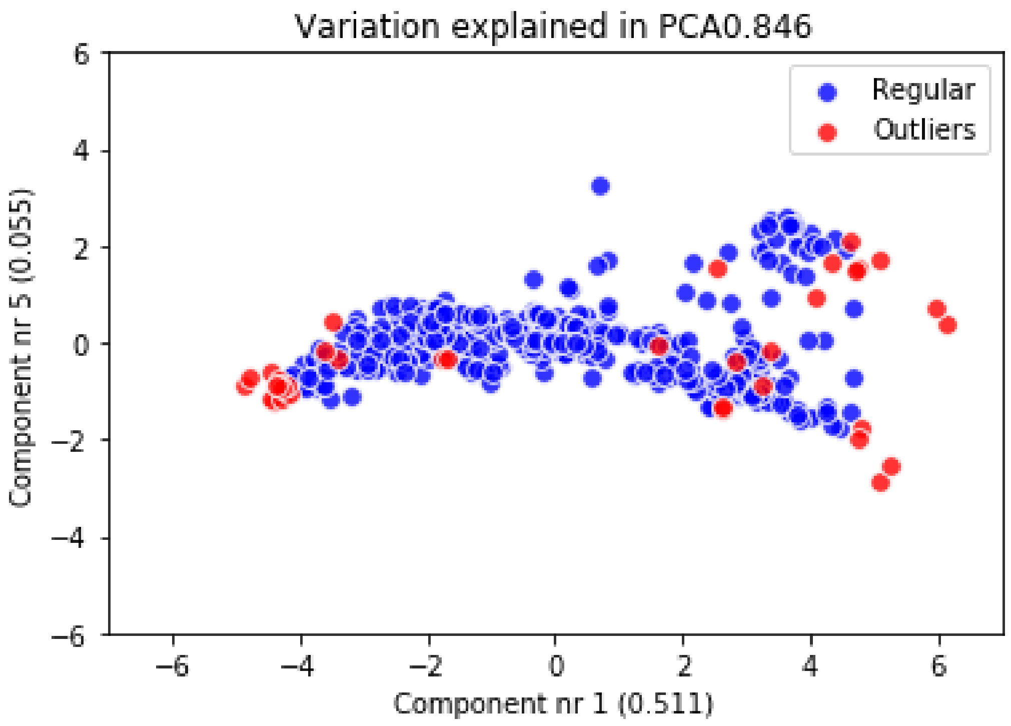




Variation explained in PCA0.846
Regular
Outliers
Component nr 3 (0.098)
Component nr 1 (0.511)
6
4
2
0
−2
−4
−6
−6
−4
−2
0
2
4
6


Variation explained in PCA0.846
Regular
Outliers
Component nr 4 (0.07)
Component nr 1 (0.511)
6
4
2
0
−2
−4
−6
−6
−4
−2
0
2
4
6


Variation explained in PCA0.846
Regular
Outliers
Component nr 5 (0.055)
Component nr 1 (0.511)
6
4
2
0
−2
−4
−6
−6
−4
−2
0
2
4
6

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In [ ]:
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