

## **CPS 844 Lab 9**

04/13/2022

Section 1

Ryan Soliven

500840952

### **# 1) (10 points) Load the data from the file 'dataOutliers.npy'**

#### **Code**

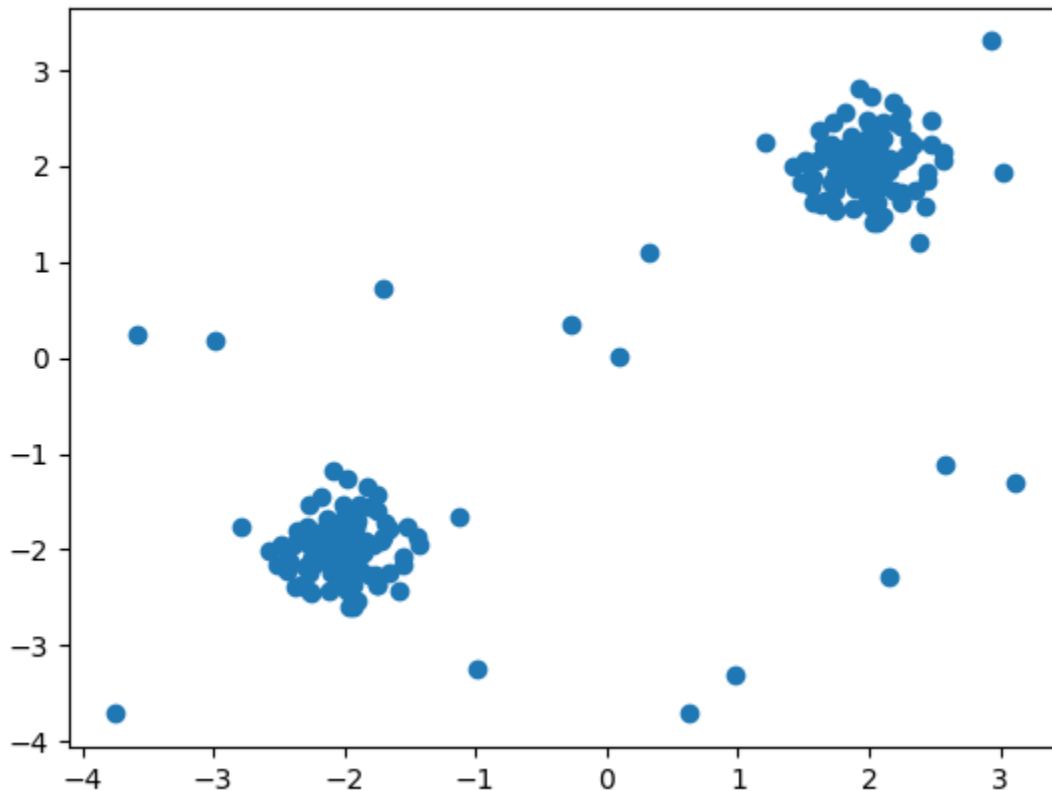
```
data = np.load("dataOutliers.npy")
```

### **# 2) (10 points) Create a scatter plot to visualize the data (This is just a FYI, make sure to comment the below line after you visualized the data)**

#### **Code**

```
plt.scatter(data[:,0], data[:,1])  
plt.show()
```

#### **Results**



**# 3) (50 points) Anomaly detection: Density-based**  
**# Fit the LocalOutlierFactor model for outlier detection**  
**# Then predict the outlier detection labels of the data points**

**Code**

```
clf = LocalOutlierFactor()
y_pred = clf.fit_predict(data)
n_errors = (y_pred != data[:,1]).sum()
X_scores = clf.negative_outlier_factor_
```

**# 4) (30 points) Plot results: make sure all plots/images are closed before running the below commands**

**# Create a scatter plot of the data (exact same as in 2) )**  
**# Then, indicate which points are outliers by plotting circles around the outliers**

**Code**

```
lofs_index = np.where(y_pred!=1)
values = data[lofs_index]
plt.title("Local Outlier Factor (LOF)")
plt.scatter(data[:,0], data[:,1], label="Normal")
plt.scatter(values[:,0], values[:,1], s=100, edgecolors="r",
facecolors="none", label="Outlier")
plt.legend(loc="upper left")
plt.show()
```

**Results**

Local Outlier Factor (LOF)

