✖

Anomaly Detection

5 questions

1 point

1.
For which of the following problems would anomaly detection be a suitable algorithm?

- [ ] Given an image of a face, determine whether or not it is the face of a particular famous individual.
- [ ] Given data from credit card transactions, classify each transaction according to type of purchase (for example: food, transportation, clothing).
- [ ] Given a dataset of credit card transactions, identify unusual transactions to flag them as possibly fraudulent.
- [ ] From a large set of primary care patient records, identify individuals who might have unusual health conditions.

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1 point

2.
Suppose you have trained an anomaly detection system for fraud detection, and your system that flags anomalies when $p(x)$ is less than ε, and you find on the cross-validation set that it is missing many fradulent transactions (i.e., failing to flag them as anomalies). What should you do?

- ○ Decrease ε
- ○ Increase ε

1
point

3.
Suppose you are developing an anomaly detection system to catch manufacturing defects in airplane engines. You model uses

$p(x) = \prod_{j=1}^{n} p(x_j; \mu_j, \sigma_j^2)$.

You have two features x_1 = vibration intensity, and x_2 = heat generated. Both x_1 and x_2 take on values between 0 and 1 (and are strictly greater than 0), and for most "normal" engines you expect that $x_1 \approx x_2$. One of the suspected anomalies is that a flawed engine may vibrate very intensely even without generating much heat (large x_1, small x_2), even though the particular values of x_1 and x_2 may not fall outside their typical ranges of values. What additional feature x_3 should you create to capture these types of anomalies:

- $x_3 = \frac{1}{x_1}$
- $x_3 = x_1 + x_2$
- $x_3 = \frac{1}{x_2}$
- $x_3 = \frac{x_1}{x_2}$

1
point

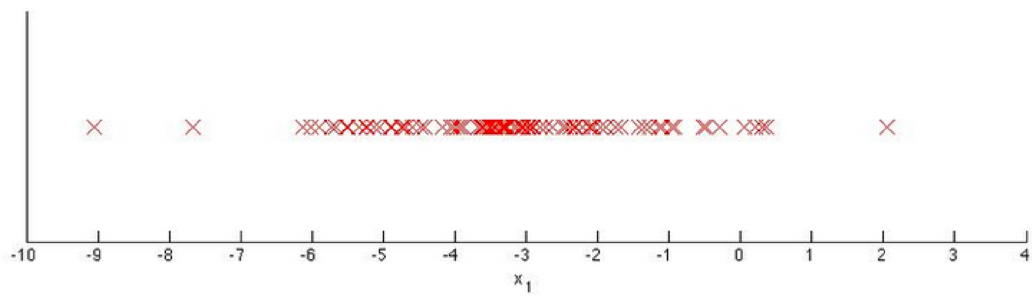
4.
Which of the following are true? Check all that apply.

- [ ] In a typical anomaly detection setting, we have a large number of anomalous examples, and a relatively small number of normal/non-anomalous examples.
- [ ] When developing an anomaly detection system, it is often useful to select an appropriate numerical performance metric to evaluate the effectiveness of the learning algorithm.
- [ ] In anomaly detection, we fit a model $p(x)$ to a set of negative ($y = 0$) examples, without using any positive examples we may have collected of previously observed anomalies.
- [ ]

When evaluating an anomaly detection algorithm on the cross validation set (containing some positive and some negative examples), classification accuracy is usually a good evaluation metric to use.

1
point

5.
You have a 1-D dataset $\{x^{(1)}, \ldots, x^{(m)}\}$ and you want to detect outliers in the dataset. You first plot the dataset and it looks like this:



Suppose you fit the gaussian distribution parameters μ_1 and σ_1^2 to this dataset. Which of the following values for μ_1 and σ_1^2 might you get?

- $\mu_1 = -3, \sigma_1^2 = 4$
- $\mu_1 = -6, \sigma_1^2 = 4$
- $\mu_1 = -3, \sigma_1^2 = 2$
- $\mu_1 = -6, \sigma_1^2 = 2$

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