Quiz: Anomaly Detection

Question 1:

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

☑ Given a dataset of credit card transactions, identify unusual transactions to flag them as possibly fraudulent.

> ✓ **Correcto**
> By modeling "normal" credit card transactions, you can then use anomaly detection to flag the unusuals ones which might be fraudulent.

☐ From a large set of primary care patient records, identify individuals who might have unusual health conditions.

☐ Given data from credit card transactions, classify each transaction according to type of purchase (for example: food, transportation, clothing).

☐ Given an image of a face, determine whether or not it is the face of a particular famous individual.

> No seleccionaste todas las respuestas correctas

Results: Correct

Question 2:

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 mis-flagging far too many good transactions as fradulent. What should you do?

◉ Decrease ε

◯ Increase ε

> ✓ **Correcto**
> By decreasing ε, you will flag fewer anomalies, as desired.

Results: Correct

Question 3:

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:

○ $x_3 = (x_1 + x_2)^2$

○ $x_3 = x_1^2 \times x_2^2$

◉ $x_3 = \frac{x_1}{x_2}$

○ $x_3 = x_1 \times x_2^2$

✓ **Correcto**
This is correct, as it will take on large values for anomalous examples and smaller values for normal examples.

Results: Correct

Question 4

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.

☑ 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.

    ✓ **Correcto**
    We want to model "normal" examples, so we only use negative examples in training.

☑ 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.
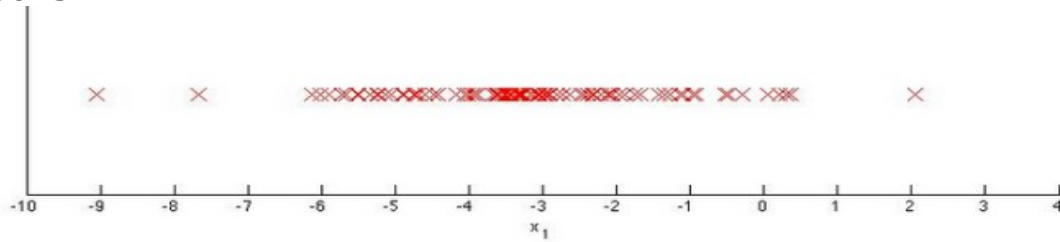
    ✓ **Correcto**
    You should have a good evaluation metric, so you can evaluate changes to the model such as new features.

☐ 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.

Results: Correct

Question 5

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?

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

✓ **Correcto**

This is correct, as the data are centered around -3 and tail most of the points lie in [-5, -1].

Results:　　**Correct**