

Anomaly Detection

Quiz, 5 questions

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

- ☒ Given data from credit card transactions, classify each transaction according to type of purchase (for example: food, transportation, clothing).
- ☒ From a large set of primary care patient records, identify individuals who might have unusual health conditions.
- ☒ In a computer chip fabrication plant, identify microchips that might be defective.
- ☐ From a large set of hospital patient records, predict which patients have a particular disease (say, the flu).

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2.
Suppose you have trained an anomaly detection system that flags anomalies when $p(x)$ is less than ϵ , and you find on the cross-validation set that it has too many false negatives (failing to flag a lot of anomalies). What should you do?

- ☒ Decrease ϵ
- ☐ Increase ϵ

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3.

Suppose you are developing an anomaly detection system to catch manufacturing defects in airplane engines. Your 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:

- ☒ $x_3 = \frac{x_1}{x_2}$
- ☐ $x_3 = (x_1 + x_2)^2$
- ☐ $x_3 = x_1 \times x_2^2$
- ☐ $x_3 = x_1^2 \times x_2^2$

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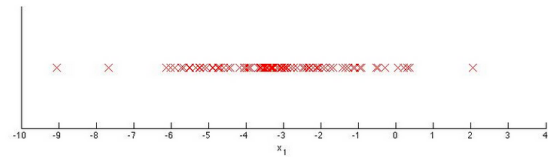
4.

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

- ☒ If you do not have any labeled data (or if all your data has label $y = 0$), then it is still possible to learn $p(x)$, but it may be harder to evaluate the system or choose a good value of ϵ .
- ☐ If you are developing an anomaly detection system, there is no way to make use of labeled data to improve your system.
- ☐ If you have a large labeled training set with many positive examples and many negative examples, the anomaly detection algorithm will likely perform just as well as a supervised learning algorithm such as an SVM.
- ☒ When choosing features for an anomaly detection system, it is a good idea to look for features that take on unusually large or small values for (mainly the) anomalous examples.

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5.
You have a 1-D dataset $\{x^{(1)}, \dots, x^{(m)}\}$ 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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