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2. Review of Basic Concepts
Review of Basic Concepts

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$\left[\left[A\right]\right]$ either takes value 1 or 0 depending on whether A is True or False. For example, $\left[\left[1 = 3\right]\right] = 0$, $\left[\left[1 = 1\right]\right] = 1$, and $\left[\left[1 \neq 3\right]\right] = 1$

Concept Review Problem: car accident prediction 1

1/1 point (graded)
In this problem, we will put ourselves in the shoes of a car insurance company. Our goal is to find out whether customers were involved in an accident on July 4th, 1998.

For 8 customers, we know the following information:

1. number of accidents the customer made in the past.

2. number of miles the customer has driven.

3. the customer's age

Also, for 5 of the customers, we know whether each of them was involved in an accident on July 4th, 1998.

If we want to learn a model in a supervised way, what is n, the number of training examples?

$n = $ | 5 | ✔ **Answer:** 5

Solution:

We have 5 data points with known labels.

| Submit | You have used 1 of 3 attempts

ⓘ   Answers are displayed within the problem

Concept Review Problem: car accident prediction 2

1/1 point (graded)
The insurance company recorded relevant information for all 8 customers, as illustrated in the table below.

	number of past accidents	miles customer drove so far	customer's age
customer 1	0	2710.9	21
customer 2	2	13209.2	40
customer 3	1	89001.4	32
customer 4	3	12381.1	18

customer 5	0	1893.5	24
customer 6	2	32493.5	24
customer 7	1	5443.5	30
customer 8	0	4493.5	28

What is the dimension of each feature vector?

$d =$ | 3 | ✔ **Answer:** 3

Solution:

Each feature vector has length 3 (columns in the table), and thus its dimension is 3.

| Submit | You have used 1 of 3 attempts

ⓘ   Answers are displayed within the problem

Concept Review Problem: car accident prediction 3

1/1 point (graded)
How many feature vectors are there in the above table?

Number of Feature vectors | 8 | ✔ **Answer:** 8

Solution:

There are 8 rows in the table.

Submit	You have used 1 of 3 attempts

ℹ Answers are displayed within the problem

Concept Review Problem: Classifier and Training Error 1

1/1 point (graded)

Assume we have training data and a classifier like the following: (where $h(x)$ denotes the value outputted by the classifier with the data point as input)

	$h(x)$	y
data 1	1	1
data 2	-1	1
data 3	1	1
data 4	1	-1
data 5	-1	-1

What is the training error?

$\varepsilon_n(h) = $ [2/5] ✔ **Answer:** 0.4

Solution:

We have 5 data points total, two of which $h(x)$ does not match y (data2 and data4). Thus $\varepsilon_n(h) = \frac{1}{5} \sum_{i=1}^{5} \left[\left[h(x_i) \neq y \right]\right] = \frac{2}{5}$

Submit	You have used 1 of 3 attempts

ⓘ   Answers are displayed within the problem

Concept Review Problem: Classifier and Training Error 2

1/1 point (graded)

Now let's examine the training error $\varepsilon_n (h)$ in a general sense. $\varepsilon_n (h)$ is a function of: (choose all those apply)

✅ n, the number of training data

✅ h, the classifier

⬜ the number of test data

✔

Solution:

By definition, $\varepsilon_n (h) = \frac{1}{n} \sum_{i=1}^{n} \left[\left[h (x^i) \neq y^i\right]\right]$. Because x, y(training set) is given, $\varepsilon_n (h)$ depends on n and h. It does no thave any term related to the test data.

Submit	You have used 1 of 3 attempts

ⓘ   Answers are displayed within the problem

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Topic: Unit 1 Linear Classifiers and Generalizations (2 weeks):Lecture 2. Linear Classifier and Perceptron / 2. Review of Basic Concepts

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💬 **Concept review problem 3 and 4**

Please can someone explain to me why ; the dimension of each feature vector? is XXX and nu...   **6**

💬 **Problem with grading the last exercise**

The first time I have chosen the right answers but it shows me as wrong answer ! Could you p...   **4**

? **Textbook Recommendation**

Dear Staff, Looking for a textbook recommendation for this course. Thanks!   **3**

☑ **Why "online" ?**

In this video (10:03) the prof defines the Perceptron algorithm as "a very simple online mistak...   **3**

👤 Community TA

? **[Staff] where are the slides ?**

Hi, Why have slides not been upgraded to the resources page ? Thanks   **6**

💬 **Synthax**

Please, could someone telle me how to wright dimension of a vector with m rows and n colu...   **3**

💬 **(Related to question 1) Shouldn't we consider some of the known data points with labels as test examples?**

If we consider all the known data points with labels as Training examples, then how will we c...   **3**

☑ **Training error**

Kindly explain, why we are using double brackets for predicted labels and actual labels in trai...   **4**

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