Assessment 1: Online quiz: Sample

Assessment instructions

Type

Online quiz

Weight

5%

Expected time

30 minutes

What you need

You need a reliable internet connection.

Instructions

This is a sample - Actual Quiz will be given in Week 3.

Ensure that you submit it to get graded.

Marking and feedback

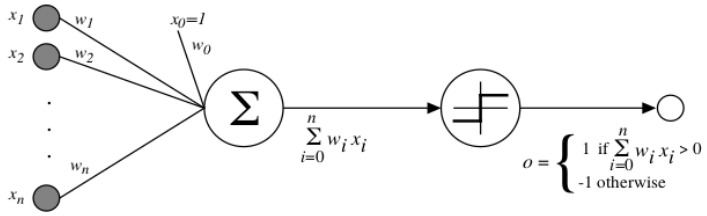
This online quiz constitutes 5% of your final grade for the course. Feedback and results will be provided to you one day after the deadline for the quiz.

Note this is a sample only, the actual quiz will be held on Week 3 Tuesday 6 pm.

Open Book Quiz

问题1

Consider the figure below.



$$o(x_1, \ldots, x_n) = \begin{cases} 1 \text{ if } w_0 + w_1 x_1 + \cdots + w_n x_n > 0 \\ -1 \text{ otherwise.} \end{cases}$$

Sometimes we'll use simpler vector notation:

$$o(\vec{x}) = \begin{cases} 1 \text{ if } \vec{w} \cdot \vec{x} > 0 \\ -1 \text{ otherwise.} \end{cases}$$

Which one of the following options best describes the figure above?

- Logistic regression model
- Perceptron
- Step function
- Linear regression model
- None of the above

问题2

Consider the code below.

```
def step_gradient(b_current, m_current, points, learningRate):
    b_gradient = 0
    m_gradient = 0
```

```
    N = float(len(points))
    for i in range(0, len(points)):
        x = points[i, 0]
        y = points[i, 1]
        b_gradient += -(2/N) * (y - ((m_current * x) + b_current))
        m_gradient += -(2/N) * x * (y - ((m_current * x) + b_current))
    new_b = b_current - (learningRate * b_gradient)
    new_m = m_current - (learningRate * m_gradient)
    return [new_b, new_m]
```

What is there a major difference between the calculation for b and m gradients?

```
b_gradient += -(2/N) * (y - ((m_current * x) + b_current))
m_gradient += -(2/N) * x * (y - ((m_current * x) + b_current))
```

- Due to the difference in the activation functions.
- Due to the difference in the way gradients are derived and computed for the coefficients, bias (b) and weight term (m)
- Due to the difference in the convergence proof
- None of the above

问题3

Your friend wants to measure the strength of the correlation between two variables while doing a project that is using a large and complex linear model. Which of the following would you recommend as the best measure for correlation?

- R Score
- R Squared Score
- RMSE
- All of the above

问题4

You are given a project that involves a team in multiple loans where all contribute to the code repository of the project that needs a sophisticated version control system. Which one of the following would be best for your project?

- Dropbox
- Moodle
- Github
- None of the above

问题5

What evaluation metric below would be best suited to evaluate a model that is used to predict if someone has COVID-19?

- AUC ad ROC curve
- Confusion Matrix
- F1 Score
- All of the above

问题6

Your model got an R-Squared Score of 95 % on the training dataset and 60 % on the test dataset. Taking into account knowledge from Week 1 and 2, what does this indicate?

- The model is good enough to be presented to your colleagues.
- There is an indication of overfitting and you need to consider validation set or a better way to stop training so that model does not over-train.

- The model and training algorithm needs to change since the test performance is not good.
- All of the above
- None of the above

问题7

Which of the following statements makes the most sense about n-fold cross-validation for models considered in Week 1 and 2?

- n-fold cross-validation measures uncertainty in data but does not measure uncertainty in model parameters if single experiments are done for each fold.
- n-fold cross-validation automatically measures uncertainty in data and model parameters.
- n-fold cross-validation is an industry-standard and must be done for all machine learning and data mining projects, regardless of model and size of data.
- All of the above

问题8

Consider the scenario: A machine learning model M learns from data D for a task T. The training or learning algorithm L improves the performance or error measure E.

How would you ensure that E takes into account the variance-bias problem?

- Use a validation set and determine early stopping based on trial experiments.
- Ensure that you implement regularisation in the model.
- Both of the above (A and B)
- None of above

- Use sophisticated measure of E such an F1 score and R Squared

问题9

Consider the scenario: A machine learning model M learns from data D for a task T. The training or learning algorithm L improves the performance or error measure E. What type of learning algorithm makes predictions when you have a set of input data and you know the possible responses?

- Active learning
- Supervised learning
- Unsupervised learning
- Linear regression model
- None of the above

问题10

Pick the statement that makes the most sense.

- Any machine learning algorithm can be used to adjust parameters for any type of model.
- L1 is always better than L2 regularisation because of convergence properties.
- Overfitting is when a predictive model is accurate but takes too long to run
- Overfitting is when you perform hyperparameter tuning and performance degrades
- There is no major difference between data science and machine learning.
- Social media employs machine learning algorithms that are vetted by government and ethical standard committees.

- [ ] None of the above