**Instructions**: Please complete and submit your work to the appropriate folder in LumiNUS. You may work in study groups, but each student must be responsible for their own submission.

Please submit all the following documents as a single zip file named StudentID-Name-H1.zip:

1. Completed Word file named as StudentID-Name-H1.docx (with all results)
2. Print preview of ipynb file named as StudentID-Name-H1.pdf (with all results)
3. Working ipynb file named as StudentID-Name-H1.ipynb
4. A machine learning application scenario can be seen from four perspectives: (i) what is the technical problem to be solved, (ii) the data requirements, meaning can you get the data needed, (iii) security and privacy considerations, meaning what happens if data is leaked and (iv) the value proposition that machine learning brings to the table.

Choose one industry from the list below (or be creative and come up with your own) and give one example of how supervised machine learning can be applied. Your examples should follow the 4 perspectives outlined above.

Give a different example from those given in lecture. You may consult the Internet, but you must think things through yourself.

|  |  |  |
| --- | --- | --- |
| Retail | Fashion | Industry 4.0 |
| Banking | Education | Social Media |
| Healthcare | Communication Networks | Smart Home |

ANSWER:

The example of supervised learning is Haidilao Hot Pot in catering industry, which is a well-known brand in China as well as Singapore. (i)There is a problem that every restaurant faces. How much ingredient need to be prepared every day, which used to be tackled by the experienced chef. However, as the international chain restaurant, no one can predict the amount of ingredient for every brunch. (ii)Therefore, after collecting a period time of the ingredient quantity demanded, via the consuming of dishes, the ingredient quantity required curve can be learnt. (iii) The data is not related to the finance or the privacy of customers, which is not sensitive. So, the protection burden is not serious. (iv) The machine learning can predict the demand of food materials more accurately, and it can also take weather, temperature, season in to account. For example, people prefer hot pot if it is a rainy day in cold winter rather than in burning hot summer days. By considering more features, the prediction will be more accurate which can help saving the cost a lot.

1. Redo Problem 1 for the unsupervised learning scenario. Give one example of an application scenario that is different from the examples discussed in the lectures.

ANSWER:

Still the example of Haidilao Hot Pot. The considerate and gentle service of it is one of the reasons of its outstanding. (i) If the preference of every customer is clear, it will be easy for waiters to serve well. Obviously, this is an impossible mission for human brain to remember and classify the customers behaviors. (ii) There is a camera over every table in Haidilao, to catch the status of the customers timely. Through extracting the motion, meal time and the expenditure, classify the customers into groups like preferring enthusiastic service or keeping distance, whether it is necessary to please he or she by sending a gift after meal. (iii) The security of data should be in high level, as it is related to the privacy of customers. (iv) Personalized service is important for establishing a premium image to customer, where people are willing to spend more money for the service. On the other hand, the restaurant can achieve an eyes-brightened profit.

1. Redo Problem 1 for the reinforcement learning scenario. Give one example of an application scenario that is different from the examples discussed in the lectures.

ANSWER:

There is a nearly household mobile game in China, Wang Zhe Rong Yao(王者荣耀), which is similar to LOLm. There is an algorithm called conscious who acts like Alpha Zero. (i)To test the balance between characters or help the training for eSports players, the computer players are necessary. If the algorithm can perform as the normal players or play the characters to the perfection to test the boundary of the game, it will be better. (ii) The algorithm can learn the game from playing with itself as the game is already there. The win or lose outcome is the feedback. (iii) The data is not sensitive and will not bring any privacy problem as the game and algorithm both belongs to the publisher, Tencent. (iv) The rule and possibility of Moba games, in my opinion, are much more complex than chest. It is the attempt for machine learning utilizes in a complex system.

1. Suppose we want to remove vowels from a sentence. Write Python code to do this using iterators and list comprehension. The input sentence is: "The quick brown fox jumps over the lazy dog".
   1. Paste your Python code below, as well as the output of your program with the given input.
   2. Submit your iPython notebook file (ipynb file) as well as a pdf print preview of the ipynb file as instructed above.

def remove\_vowels(sentence):

return "".join([l for l in sentence if str.lower(l) not in "aeiou"])

sentence = "The quick brown fox jumps over the lazy dog"

print("Filtered result: " + remove\_vowels(sentence))