元智大學106學年度第二學期期末考試命題紙

第1 頁

共1頁

★ 本次考試為（請勾選）： □CLOSE BOOK ■OPEN BOOK

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| --- | --- | --- | --- | --- | --- |
| 科目 | 系所 | 年級 | 份數 | 考試日期 | 命題者 |
| IE574資料視覺(Data Visualization) | IEM | 1 | 35 | 2018.4.24 18:30~21:00 | 孫天龍 |

◎ 可使用之文具用品（請勾選）： □ 計算機 □ 電子字典或字典 □ 其他

* 禁止使用大哥大或BB CALL，違規者以違反考場規則不得再應考處理。

Use PyTorch to develop a MLP that learns the function *y*= *f*(*x*) from following training data. Use matplotlib to develop an animation to **visualize** the training process. Demo the animation on your computer and upload a word file to portal.

**Training data:**

|  |  |
| --- | --- |
| X | 200 equally spaced points between -2 and 2, generated using torch.linspace function. |
| Y | *y* = *x*3 + 2*x*2 + 0.3*b* , where *b* is a random number drawing from a normal distribution with zero mean and variance of one, generated using torch.randn function. |

**MLP NN design:**

|  |  |
| --- | --- |
| Hidden layers | The MLP should contain 3 hidden layers with 5, 10, 8 neurons, respectively. |
| Activation function | Use the same activation function for all neurons in the same layers. Let the activation function for the three hidden layers be: relu, sigmod, and relu, respectively. |
| Loss function | Use mean square error to calculate the loss. |
| Optimization function | Use SGD for problem 1 and gradient decent method for problem 2. |
| Learning rate | 1 |

**Training design:**

|  |  |
| --- | --- |
| Epoch | Train the MLP 30 epochs. |

1. (a) Implement this MLP using PyTorch’s neural network module, i.e., class Net(torch.nn.Module).
2. Explain your PyTorch code.
3. (a) Implement this MLP using matrix multiplication. Use gradient decent method to update the weights in back propagation.
4. Explain your PyTorch code.
5. Modify your NN in Prob. 1 to improve its performance and explain your model tuning process.