NYCU Pattern Recognition, Homework 4

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Part. 1, Kaggle (70% [50% comes from the competition]):

(10%) Implementation Details

Type your answer here.

(10%) Experimental Results

Type your answer here.

Part. 2, Questions (30%):

1. (10%) Why Sigmoid or Tanh is not preferred to be used as the activation function in the hidden layer of the neural network? Please answer in detail.

    Type your answer here.

2. (10%) What is overfitting? Please provide at least three techniques with explanations to overcome this issue.

    Type your answer here.

3. (15%) Given a valid kernel $k_1(x, x')$,prove that the following proposed functions are or are not valid kernels. If one is not a valid kernel, give an example of $k(x, x')$ that the corresponding K is not positive semidefinite and show its eigenvalues.

    a. $k(x, x') = k_1(x, x') + \|x\|^2$
    b. $k(x, x') = k_1(x, x') - 1$
    c. $k(x, x') = k_1(x, x') + \exp(x^T x')$
    d. $k(x, x') = \exp(k_1(x, x')) - 1$

    Type your answer here.