

Programming Assignment 3

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Setup:

- Open Programming_Assignment_3.ipynb in colab by file/ open notebook/ upload, choose the file from downloads.
- Upload chef_data.pickle to Google drive, make sure both Google colab and Google drive are logged in with same account.
- Import libraries and mount Google drive using the code given.

The attached dataset chefs_data.pickle contains relevant performance statistics from the past 5,000 events (the company caters numerous events throughout the year). Please read the file like this:

The inputs are 22-element binary vectors. Each element represents one of the 22 chefs, with a 1 indicating that the chef participated in a given project and a 0 meaning that they did not. The outputs are 4-element vectors indicating:

- The number of tasks completed,
- The number of tasks incomplete,
- The average bonus (\$) each chef earned after the project, and
- The money (\$) that the company earned (positive number) or lost (negative number) after the project.

The training and test sets include 4,000 and 1,000 samples, respectively.

(a) (10pts) The input shape of input layer should match with number of columns in training data.

Write your code to get number of inputs and assign it to num_inputs variable.

Hint: Use shape of x_train

(b) (50pts) To help the event manager with selecting chefs, your task is to use Keras/Tensorflow to train an artificial neural network on the training data and assess its prediction accuracy for future projects using the test data.

The code for input layer is given. Your task is to write the code for next layers to complete the model architecture.

hidden_layer1 (Dense) (None, 20)

hidden_layer2 (Dense) (None, 20)

hidden_layer3 (Dense) (None, 20)

output (Dense) (None, 4)

Important: Note that this is not a classification but a value prediction task. This means that you should not use Softmax as your output function, because the outputs do not add up to one, use sigmoid activation.

(c) (40pts)

Run the network for a number of epochs and batch size mentioned below. you should not use cross-entropy as your loss (error) function; a better choice would be the mean squared error (MSE) between the desired and actual outputs ('mse' in Keras).

This task includes two parts:

Design model.compile:

- 1) mse(mean square error) as loss
- 2) adam() as optimizer with learning rate =0.05
- 3) metrics as accuracy

Design model.fit:

- 1) epochs=100
- 2) batch_size=100

Submission:

Deadline: 7th november, 2024, 4:00 PM

Download the notebook as .ipynb file (File/ download/ download .ipynb).

Upload this file on blackboard in the programming assignment 3 section.

