Read me of A study on different neural network structure for eatable and poisonous mushroom classification

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Prerequisite

1. IDE: PyCharm
2. Programming language: Python 3.5 and above
3. Python Packages
    a. Numpy
    b. Pandas
4. Neural Network Package: TensorFlow and TensorBoard

What's in the package?

1. Main Python script (mushroom_experiment.py)
2. Customized dataset (mushroom_mod.csv)
3. This readme document

Steps to run the program

1. Add `mushroom_experiment.py` and `mushroom_mod.csv` to a working directory
2. Run the python script
3. Run TensorBoard and see the result (See "How to run TensorBoard")

How to run TensorBoard

1. Set the path of 'logs' folder in the main script. (line: 93)

```
#Initialize TensorBoard
tensorboard = tf.keras.callbacks.TensorBoard(log_dir="logs/{}".format(time()))
```

2. Use the terminal and enter the following command
   tensorboard --logdir=logs
   Note: logs should be the directory to the 'logs' folder that was set in the first step.
3. Run any web browser (Google Chrome is recommended) and go to http://localhost:6006/ (Mac and Linux) and http://DESKTOP-XXXXXX:6006 (Windows)

```
TensorBoard 1.7.0 at http://DESKTOP-GD3F4TR:6006 (Press CTRL+C to quit)
```

Adjusting hyperparameters

Parameters/Hyperparameters	Description	Default Value	Range	Line number
Batch size	Mini-batch size	25	≥25	17
Epochs	Number of times for updating the network's parameters.	300	≤500	18
Train_to_test_ratio	The ratio used to randomly pick data for training and testing batches. The number is percentage of training set. The	0.8	0.7≤r≤0.8	19

	percentage of test set is 1-training set.			
Number of node	Number of node in the hidden layer	3	≥3	83
Activation function	(a.k.a. transfer function)	tanh	*	84
Optimizer	Optimization method to adjust the network's parameters	SGD	*	88
Loss function	Loss function used to calculate error of each iteration	mean_squared_error	*	89

* - See TensorFlow documentation for available options.