Assignment-6

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Neural Networks and Deep learning

GitHuLink:https://github.com/Divyareddy33/NeuralNetworking.git

In [2]:
```
#read the data
import pandas as pd
data = pd.read_csv('diabetes.csv')
```

In [3]:
```
path_to_csv = 'diabetes.csv'-
```

In [5]:
```
import keras
import pandas
from keras.models import Sequential
from keras.layers import Dense, Activation

# load dataset
from sklearn.model_selection import train_test_split
import pandas as pd
import numpy as np

dataset = pd.read_csv(path_to_csv, header=None).values

X_train, X_test, Y_train, Y_test = train_test_split(dataset[:,0:8], dataset[:,8],
                                                    test_size=0.25, random_state=87)
np.random.seed(155)
my_first_nn = Sequential() # create model
my_first_nn.add(Dense(20, input_dim=8, activation='relu')) # hidden layer
my_first_nn.add(Dense(4, activation='relu')) # hidden layer
my_first_nn.add(Dense(1, activation='sigmoid')) # output layer
my_first_nn.compile(loss='binary_crossentropy', optimizer='adam', metrics=['acc'])
my_first_nn_fitted = my_first_nn.fit(X_train, Y_train, epochs=100,
                                     initial_epoch=0)
print(my_first_nn.summary())
print(my_first_nn.evaluate(X_test, Y_test))
```

```
Epoch 1/100
18/18 [==============================] - 1s 2ms/step - loss: 42.5964 - acc: 0.3385
Epoch 2/100
18/18 [==============================] - 0s 2ms/step - loss: 30.6527 - acc: 0.3403
Epoch 3/100
18/18 [==============================] - 0s 2ms/step - loss: 17.5874 - acc: 0.3611
Epoch 4/100
18/18 [==============================] - 0s 2ms/step - loss: 10.7208 - acc: 0.5295
Epoch 5/100
18/18 [==============================] - 0s 2ms/step - loss: 6.6725 - acc: 0.6111
Epoch 6/100
18/18 [==============================] - 0s 2ms/step - loss: 4.0025 - acc: 0.5556
Epoch 7/100
18/18 [==============================] - 0s 2ms/step - loss: 2.9301 - acc: 0.5000
Epoch 8/100
18/18 [==============================] - 0s 2ms/step - loss: 2.6375 - acc: 0.5191
Epoch 9/100
18/18 [==============================] - 0s 2ms/step - loss: 2.3826 - acc: 0.5139
Epoch 10/100
```

In [6]:
```
#read the data
data = pd.read_csv('breastcancer.csv')
```

In [7]:
```
path_to_csv = 'sample_data/breastcancer.csv'
```

In [8]:
```
import keras
import pandas as pd
import numpy as np
from keras.models import Sequential
from keras.layers import Dense, Activation
from sklearn.datasets import load_breast_cancer
from sklearn.model_selection import train_test_split

# load dataset
cancer_data = load_breast_cancer()
X_train, X_test, Y_train, Y_test = train_test_split(cancer_data.data, cancer_data.target,
                                                    test_size=0.25, random_state=87)
np.random.seed(155)
my_nn = Sequential() # create model
my_nn.add(Dense(20, input_dim=30, activation='relu')) # hidden layer 1
my_nn.add(Dense(1, activation='sigmoid')) # output layer
my_nn.compile(loss='binary_crossentropy', optimizer='adam', metrics=['acc'])
my_nn_fitted = my_nn.fit(X_train, Y_train, epochs=100,
                         initial_epoch=0)
print(my_nn.summary())
print(my_nn.evaluate(X_test, Y_test))
```

```
Epoch 1/100
14/14 [==============================] - 1s 2ms/step - loss: 110.2545 - acc: 0.3803
Epoch 2/100
14/14 [==============================] - 0s 2ms/step - loss: 76.1194 - acc: 0.3803
Epoch 3/100
14/14 [==============================] - 0s 2ms/step - loss: 41.7353 - acc: 0.3803
Epoch 4/100
14/14 [==============================] - 0s 2ms/step - loss: 11.9064 - acc: 0.3873
Epoch 5/100
14/14 [==============================] - 0s 2ms/step - loss: 7.9976 - acc: 0.4225
Epoch 6/100
14/14 [==============================] - 0s 2ms/step - loss: 6.2010 - acc: 0.4014
Epoch 7/100
14/14 [==============================] - 0s 2ms/step - loss: 5.3807 - acc: 0.4930
Epoch 8/100
14/14 [==============================] - 0s 2ms/step - loss: 4.5558 - acc: 0.4765
Epoch 9/100
14/14 [==============================] - 0s 2ms/step - loss: 3.5828 - acc: 0.5516
Epoch 10/100
```

In [9]:
```
#read the data
data = pd.read_csv('breastcancer.csv')
```

In [10]:
```
path_to_csv = 'breastcancer.csv'
```

In [11]:
```
from sklearn.preprocessing import StandardScaler
sc = StandardScaler()
```

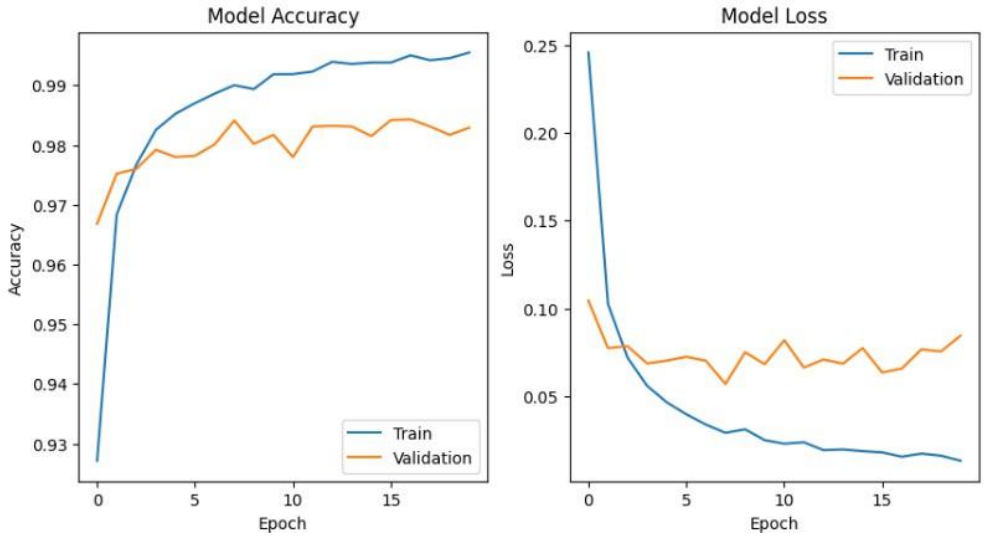
In [12]:
```
import keras
import pandas as pd
import numpy as np
from keras.models import Sequential
from keras.layers import Dense, Activation
from sklearn.datasets import load_breast_cancer
from sklearn.model_selection import train_test_split

# load dataset
cancer_data = load_breast_cancer()
X_train, X_test, Y_train, Y_test = train_test_split(cancer_data.data, cancer_data.target,
                                                    test_size=0.25, random_state=87)
np.random.seed(155)
my_nn = Sequential() # create model
my_nn.add(Dense(20, input_dim=30, activation='relu')) # hidden layer 1
my_nn.add(Dense(1, activation='sigmoid')) # output layer
my_nn.compile(loss='binary_crossentropy', optimizer='adam', metrics=['acc'])
my_nn_fitted = my_nn.fit(X_train, Y_train, epochs=100,
                         initial_epoch=0)
print(my_nn.summary())
print(my_nn.evaluate(X_test, Y_test))
```

```
Epoch 1/100
14/14 [==============================] - 1s 2ms/step - loss: 40.8152 - acc: 0.3803
Epoch 2/100
14/14 [==============================] - 0s 2ms/step - loss: 12.8738 - acc: 0.3826
Epoch 3/100
14/14 [==============================] - 0s 2ms/step - loss: 2.3873 - acc: 0.6385
Epoch 4/100
14/14 [==============================] - 0s 2ms/step - loss: 1.0803 - acc: 0.6174
Epoch 5/100
14/14 [==============================] - 0s 2ms/step - loss: 0.5198 - acc: 0.8052
Epoch 6/100
14/14 [==============================] - 0s 2ms/step - loss: 0.4618 - acc: 0.8545
Epoch 7/100
14/14 [==============================] - 0s 3ms/step - loss: 0.4190 - acc: 0.8404
Epoch 8/100
14/14 [==============================] - 0s 3ms/step - loss: 0.3760 - acc: 0.8662
Epoch 9/100
14/14 [==============================] - 0s 2ms/step - loss: 0.3560 - acc: 0.8685
```

In [13]:

```
import keras
from keras.datasets import mnist
from keras.models import Sequential
from keras.layers import Dense, Dropout
import matplotlib.pyplot as plt

# load MNIST dataset
(x_train, y_train), (x_test, y_test) = mnist.load_data()

# normalize pixel values to range [0, 1]
x_train = x_train.astype('float32') / 255
x_test = x_test.astype('float32') / 255

# convert class labels to binary class matrices
num_classes = 10
y_train = keras.utils.to_categorical(y_train, num_classes)
y_test = keras.utils.to_categorical(y_test, num_classes)

# create a simple neural network model
model = Sequential()
model.add(Dense(512, activation='relu', input_shape=(784,)))
model.add(Dropout(0.2))
model.add(Dense(512, activation='relu'))
model.add(Dropout(0.2))
model.add(Dense(num_classes, activation='softmax'))

model.compile(loss='categorical_crossentropy', optimizer='adam', metrics=['accuracy'])

# train the model and record the training history
history = model.fit(x_train.reshape(-1, 784), y_train, validation_data=(x_test.reshape(-1, 784), y_test),
                    epochs=20, batch_size=128)

# plot the training and validation accuracy and loss curves
plt.figure(figsize=(10, 5))
plt.subplot(1, 2, 1)
plt.plot(history.history['accuracy'])
plt.plot(history.history['val_accuracy'])
plt.title('Model Accuracy')
plt.ylabel('Accuracy')
plt.xlabel('Epoch')
plt.legend(['Train', 'Validation'], loc='lower right')

plt.subplot(1, 2, 2)
plt.plot(history.history['loss'])
plt.plot(history.history['val_loss'])
plt.title('Model Loss')
plt.ylabel('Loss')
plt.xlabel('Epoch')
plt.legend(['Train', 'Validation'], loc='upper right')

plt.show()
```

0.9829


Model Accuracy
Accuracy
Epoch
Train
Validation
Model Loss
Loss
Epoch
Train
Validation