In [98]:
```
import keras
import pandas
from keras.models import Sequential
from keras.layers.core import Dense, Activation
from sklearn.preprocessing import LabelEncoder

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

diabetes dataset

add a dense layer and check the accuracy

In [129…
```
dataset = pd.read_csv("NN&DeepLearning_Lesson7_SourceCode/diabetes.csv", hea

X_train, X_test, Y_train, Y_test = train_test_split(dataset[:,0:8], dataset[
                                                    test_size=0.25, random_s
np.random.seed(155)
my_first_nn = Sequential() # create model
my_first_nn.add(Dense(20, input_dim=8, activation='relu')) # hidden layer 1
my_first_nn.add(Dense(40,activation = 'relu')) # hidden layer 2
my_first_nn.add(Dense(1, activation='sigmoid')) # output layer
my_first_nn.compile(loss='binary_crossentropy', optimizer='adam', metrics=['
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 [==============================] - 0s 5ms/step - loss: 4.9225 - acc:
0.4670
Epoch 2/100
18/18 [==============================] - 0s 5ms/step - loss: 2.5341 - acc:
0.5972
Epoch 3/100
18/18 [==============================] - 0s 5ms/step - loss: 1.5246 - acc:
0.6128
Epoch 4/100
18/18 [==============================] - 0s 5ms/step - loss: 1.2265 - acc:
0.6042
Epoch 5/100
18/18 [==============================] - 0s 6ms/step - loss: 1.0441 - acc:
0.5938
Epoch 6/100
18/18 [==============================] - 0s 5ms/step - loss: 0.9112 - acc:
0.6233
Epoch 7/100
18/18 [==============================] - 0s 7ms/step - loss: 0.8028 - acc:
0.6319
Epoch 8/100
18/18 [==============================] - 0s 6ms/step - loss: 0.7637 - acc:
0.6233
Epoch 9/100
18/18 [==============================] - 0s 5ms/step - loss: 0.7107 - acc:
0.6667
Epoch 10/100
18/18 [==============================] - 0s 5ms/step - loss: 0.6739 - acc:
0.6823
Epoch 11/100
18/18 [==============================] - 0s 5ms/step - loss: 0.6347 - acc:
0.6979
Epoch 12/100
18/18 [==============================] - 0s 6ms/step - loss: 0.6302 - acc:
0.6823
Epoch 13/100
18/18 [==============================] - 0s 6ms/step - loss: 0.6287 - acc:
0.6736
Epoch 14/100
18/18 [==============================] - 0s 6ms/step - loss: 0.6073 - acc:
0.7083
Epoch 15/100
18/18 [==============================] - 0s 6ms/step - loss: 0.6030 - acc:
0.6962
Epoch 16/100
18/18 [==============================] - 0s 5ms/step - loss: 0.5997 - acc:
0.6997
Epoch 17/100
18/18 [==============================] - 0s 5ms/step - loss: 0.5805 - acc:
0.7344
Epoch 18/100
18/18 [==============================] - 0s 11ms/step - loss: 0.6540 - acc:
0.6684
Epoch 19/100
18/18 [==============================] - 0s 14ms/step - loss: 0.6182 - acc:
```

```
0.6962
Epoch 20/100
18/18 [==============================] - 0s 14ms/step - loss: 0.6073 - acc:
0.7153
Epoch 21/100
18/18 [==============================] - 0s 14ms/step - loss: 0.6121 - acc:
0.6823
Epoch 22/100
18/18 [==============================] - 0s 14ms/step - loss: 0.5704 - acc:
0.7240
Epoch 23/100
18/18 [==============================] - 0s 13ms/step - loss: 0.5884 - acc:
0.7188
Epoch 24/100
18/18 [==============================] - 0s 14ms/step - loss: 0.5915 - acc:
0.7049
Epoch 25/100
18/18 [==============================] - 0s 13ms/step - loss: 0.5581 - acc:
0.7101
Epoch 26/100
18/18 [==============================] - 0s 4ms/step - loss: 0.5585 - acc:
0.7170
Epoch 27/100
18/18 [==============================] - 0s 5ms/step - loss: 0.5704 - acc:
0.7205
Epoch 28/100
18/18 [==============================] - 0s 6ms/step - loss: 0.5631 - acc:
0.7344
Epoch 29/100
18/18 [==============================] - 0s 4ms/step - loss: 0.5503 - acc:
0.7413
Epoch 30/100
18/18 [==============================] - 0s 6ms/step - loss: 0.5516 - acc:
0.7431
Epoch 31/100
18/18 [==============================] - 0s 4ms/step - loss: 0.5504 - acc:
0.7170
Epoch 32/100
18/18 [==============================] - 0s 4ms/step - loss: 0.5466 - acc:
0.7240
Epoch 33/100
18/18 [==============================] - 0s 9ms/step - loss: 0.5368 - acc:
0.7378
Epoch 34/100
18/18 [==============================] - 0s 13ms/step - loss: 0.5500 - acc:
0.7188
Epoch 35/100
18/18 [==============================] - 0s 13ms/step - loss: 0.5477 - acc:
0.7170
Epoch 36/100
18/18 [==============================] - 0s 6ms/step - loss: 0.5581 - acc:
0.7205
Epoch 37/100
18/18 [==============================] - 0s 7ms/step - loss: 0.5624 - acc:
0.7153
Epoch 38/100
```

```
18/18 [==============================] - 0s 13ms/step - loss: 0.5732 - acc:
0.7153
Epoch 39/100
18/18 [==============================] - 0s 13ms/step - loss: 0.5809 - acc:
0.7118
Epoch 40/100
18/18 [==============================] - 0s 11ms/step - loss: 0.5226 - acc:
0.7483
Epoch 41/100
18/18 [==============================] - 0s 6ms/step - loss: 0.5206 - acc:
0.7448
Epoch 42/100
18/18 [==============================] - 0s 4ms/step - loss: 0.5174 - acc:
0.7483
Epoch 43/100
18/18 [==============================] - 0s 5ms/step - loss: 0.5342 - acc:
0.7413
Epoch 44/100
18/18 [==============================] - 0s 4ms/step - loss: 0.5703 - acc:
0.7222
Epoch 45/100
18/18 [==============================] - 0s 4ms/step - loss: 0.5646 - acc:
0.7517
Epoch 46/100
18/18 [==============================] - 0s 5ms/step - loss: 0.5568 - acc:
0.7292
Epoch 47/100
18/18 [==============================] - 0s 14ms/step - loss: 0.5780 - acc:
0.7066
Epoch 48/100
18/18 [==============================] - 0s 14ms/step - loss: 0.5272 - acc:
0.7500
Epoch 49/100
18/18 [==============================] - 0s 13ms/step - loss: 0.5534 - acc:
0.7170
Epoch 50/100
18/18 [==============================] - 0s 14ms/step - loss: 0.5479 - acc:
0.7378
Epoch 51/100
18/18 [==============================] - 0s 14ms/step - loss: 0.5249 - acc:
0.7517
Epoch 52/100
18/18 [==============================] - 0s 11ms/step - loss: 0.5858 - acc:
0.7153
Epoch 53/100
18/18 [==============================] - 0s 5ms/step - loss: 0.5274 - acc:
0.7361
Epoch 54/100
18/18 [==============================] - 0s 5ms/step - loss: 0.5199 - acc:
0.7448
Epoch 55/100
18/18 [==============================] - 0s 4ms/step - loss: 0.5239 - acc:
0.7500
Epoch 56/100
18/18 [==============================] - 0s 4ms/step - loss: 0.5587 - acc:
0.7222
```

```
Epoch 57/100
18/18 [==============================] - 0s 3ms/step - loss: 0.5102 - acc:
0.7587
Epoch 58/100
18/18 [==============================] - 0s 3ms/step - loss: 0.5293 - acc:
0.7378
Epoch 59/100
18/18 [==============================] - 0s 3ms/step - loss: 0.5340 - acc:
0.7361
Epoch 60/100
18/18 [==============================] - 0s 4ms/step - loss: 0.5168 - acc:
0.7691
Epoch 61/100
18/18 [==============================] - 0s 3ms/step - loss: 0.5077 - acc:
0.7517
Epoch 62/100
18/18 [==============================] - 0s 3ms/step - loss: 0.5339 - acc:
0.7257
Epoch 63/100
18/18 [==============================] - 0s 3ms/step - loss: 0.5253 - acc:
0.7309
Epoch 64/100
18/18 [==============================] - 0s 3ms/step - loss: 0.5475 - acc:
0.7431
Epoch 65/100
18/18 [==============================] - 0s 3ms/step - loss: 0.5237 - acc:
0.7361
Epoch 66/100
18/18 [==============================] - 0s 3ms/step - loss: 0.5371 - acc:
0.7240
Epoch 67/100
18/18 [==============================] - 0s 3ms/step - loss: 0.5318 - acc:
0.7361
Epoch 68/100
18/18 [==============================] - 0s 3ms/step - loss: 0.5473 - acc:
0.7292
Epoch 69/100
18/18 [==============================] - 0s 3ms/step - loss: 0.5096 - acc:
0.7500
Epoch 70/100
18/18 [==============================] - 0s 2ms/step - loss: 0.5016 - acc:
0.7587
Epoch 71/100
18/18 [==============================] - 0s 3ms/step - loss: 0.4905 - acc:
0.7552
Epoch 72/100
18/18 [==============================] - 0s 3ms/step - loss: 0.4914 - acc:
0.7674
Epoch 73/100
18/18 [==============================] - 0s 3ms/step - loss: 0.5148 - acc:
0.7396
Epoch 74/100
18/18 [==============================] - 0s 6ms/step - loss: 0.5276 - acc:
0.7344
Epoch 75/100
18/18 [==============================] - 0s 13ms/step - loss: 0.5283 - acc:
```

```
0.7396
Epoch 76/100
18/18 [==============================] - 0s 14ms/step - loss: 0.5054 - acc:
0.7639
Epoch 77/100
18/18 [==============================] - 0s 14ms/step - loss: 0.5750 - acc:
0.7188
Epoch 78/100
18/18 [==============================] - 0s 14ms/step - loss: 0.5290 - acc:
0.7413
Epoch 79/100
18/18 [==============================] - 0s 13ms/step - loss: 0.4929 - acc:
0.7587
Epoch 80/100
18/18 [==============================] - 0s 14ms/step - loss: 0.5001 - acc:
0.7535
Epoch 81/100
18/18 [==============================] - 0s 13ms/step - loss: 0.5083 - acc:
0.7396
Epoch 82/100
18/18 [==============================] - 0s 12ms/step - loss: 0.4831 - acc:
0.7622
Epoch 83/100
18/18 [==============================] - 0s 4ms/step - loss: 0.5145 - acc:
0.7569
Epoch 84/100
18/18 [==============================] - 0s 4ms/step - loss: 0.5291 - acc:
0.7413
Epoch 85/100
18/18 [==============================] - 0s 8ms/step - loss: 0.5111 - acc:
0.7326
Epoch 86/100
18/18 [==============================] - 0s 13ms/step - loss: 0.5103 - acc:
0.7535
Epoch 87/100
```

```
18/18 [==============================] - 0s 13ms/step - loss: 0.4975 - acc:
0.7708
Epoch 88/100
18/18 [==============================] - 0s 8ms/step - loss: 0.4945 - acc:
0.7465
Epoch 89/100
18/18 [==============================] - 0s 3ms/step - loss: 0.5397 - acc:
0.7431
Epoch 90/100
18/18 [==============================] - 0s 3ms/step - loss: 0.4917 - acc:
0.7552
Epoch 91/100
18/18 [==============================] - 0s 7ms/step - loss: 0.4870 - acc:
0.7604
Epoch 92/100
18/18 [==============================] - 0s 11ms/step - loss: 0.4909 - acc:
0.7483
Epoch 93/100
18/18 [==============================] - 0s 10ms/step - loss: 0.4771 - acc:
0.7760
Epoch 94/100
18/18 [==============================] - 0s 10ms/step - loss: 0.6097 - acc:
0.7135
Epoch 95/100
18/18 [==============================] - 0s 6ms/step - loss: 0.5255 - acc:
0.7517
Epoch 96/100
18/18 [==============================] - 0s 6ms/step - loss: 0.5170 - acc:
0.7500
Epoch 97/100
18/18 [==============================] - 0s 5ms/step - loss: 0.4781 - acc:
0.7622
Epoch 98/100
18/18 [==============================] - 0s 7ms/step - loss: 0.4801 - acc:
0.7743
Epoch 99/100
18/18 [==============================] - 0s 8ms/step - loss: 0.4903 - acc:
0.7431
Epoch 100/100
18/18 [==============================] - 0s 9ms/step - loss: 0.4922 - acc:
0.7622
Model: "sequential_7"
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
dense_15 (Dense)             (None, 20)                180
_________________________________________________________________
dense_16 (Dense)             (None, 40)                840
_________________________________________________________________
dense_17 (Dense)             (None, 1)                 41
=================================================================
Total params: 1,061
Trainable params: 1,061
Non-trainable params: 0
_________________________________________________________________
None
```

```
6/6 [==============================] - 0s 3ms/step - loss: 0.6669 - acc: 0.6
562
[0.6669116020202637, 0.65625]
```

On breast cancer dataset

In [82]:
```
path_to_csv = 'NN&DeepLearning_Lesson7_SourceCode/breastcancer.csv'
```

In [87]:
```
dataset = pd.read_csv(path_to_csv)
```

In [89]:
```
dataset.head(5)
```

Out[89]:

	id	diagnosis	radius_mean	texture_mean	perimeter_mean	area_m
0	842302	M	17.99	10.38	122.80	100
1	842517	M	20.57	17.77	132.90	132
2	84300903	M	19.69	21.25	130.00	120
3	84348301	M	11.42	20.38	77.58	38
4	84358402	M	20.29	14.34	135.10	129

5 rows × 33 columns

In [93]:
```
dataset.drop(['id','Unnamed: 32'],axis=1,inplace = True)
```

In [97]:
```
dataset.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 569 entries, 0 to 568
Data columns (total 31 columns):
 #   Column                   Non-Null Count  Dtype
---  ------                   --------------  -----
 0   diagnosis                569 non-null    object
 1   radius_mean              569 non-null    float64
 2   texture_mean             569 non-null    float64
 3   perimeter_mean           569 non-null    float64
 4   area_mean                569 non-null    float64
 5   smoothness_mean          569 non-null    float64
 6   compactness_mean         569 non-null    float64
 7   concavity_mean           569 non-null    float64
 8   concave points_mean      569 non-null    float64
 9   symmetry_mean            569 non-null    float64
 10  fractal_dimension_mean   569 non-null    float64
 11  radius_se                569 non-null    float64
 12  texture_se               569 non-null    float64
 13  perimeter_se             569 non-null    float64
 14  area_se                  569 non-null    float64
 15  smoothness_se            569 non-null    float64
 16  compactness_se           569 non-null    float64
 17  concavity_se             569 non-null    float64
 18  concave points_se        569 non-null    float64
 19  symmetry_se              569 non-null    float64
 20  fractal_dimension_se     569 non-null    float64
 21  radius_worst             569 non-null    float64
 22  texture_worst            569 non-null    float64
 23  perimeter_worst          569 non-null    float64
 24  area_worst               569 non-null    float64
 25  smoothness_worst         569 non-null    float64
 26  compactness_worst        569 non-null    float64
 27  concavity_worst          569 non-null    float64
 28  concave points_worst     569 non-null    float64
 29  symmetry_worst           569 non-null    float64
 30  fractal_dimension_worst  569 non-null    float64
dtypes: float64(30), object(1)
memory usage: 137.9+ KB
```

In [99]:
```
label_encoder = LabelEncoder()

dataset['diagnosis'] = label_encoder.fit_transform(dataset['diagnosis'])
```

In [101…
```
dataset['diagnosis'].unique()
```

Out[101… array([1, 0])

In [125…
```
X = dataset.values[:,1:]
y = dataset.values[:,0]
```

In [130…
```
X_train, X_test, Y_train, Y_test = train_test_split(X, y,
                                                    test_size=0.25, random_s

np.random.seed(155)
my_first_nn = Sequential() # create model
my_first_nn.add(Dense(66, input_dim=X_train.shape[1], activation='relu')) #
```

```
my_first_nn.add(Dense(132, activation='relu')) # hidden layer 2
my_first_nn.add(Dense(1, activation='sigmoid')) # output layer
my_first_nn.compile(loss='binary_crossentropy', optimizer='adam', metrics=['
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
14/14 [==============================] - 0s 9ms/step - loss: 8.2479 - acc:
0.4836
Epoch 2/100
14/14 [==============================] - 0s 7ms/step - loss: 1.6167 - acc:
0.7864
Epoch 3/100
14/14 [==============================] - 0s 7ms/step - loss: 0.6677 - acc:
0.8756
Epoch 4/100
14/14 [==============================] - 0s 7ms/step - loss: 0.5791 - acc:
0.8850
Epoch 5/100
14/14 [==============================] - 0s 7ms/step - loss: 0.3646 - acc:
0.9038
Epoch 6/100
14/14 [==============================] - 0s 9ms/step - loss: 0.2816 - acc:
0.9366
Epoch 7/100
14/14 [==============================] - 0s 16ms/step - loss: 0.2643 - acc:
0.9178
Epoch 8/100
14/14 [==============================] - 0s 17ms/step - loss: 0.2807 - acc:
0.9202
Epoch 9/100
14/14 [==============================] - 0s 19ms/step - loss: 0.2205 - acc:
0.9178
Epoch 10/100
14/14 [==============================] - 0s 14ms/step - loss: 0.2573 - acc:
0.9108
Epoch 11/100
14/14 [==============================] - 0s 7ms/step - loss: 0.2028 - acc:
0.9319
Epoch 12/100
14/14 [==============================] - 0s 7ms/step - loss: 0.3799 - acc:
0.9155
Epoch 13/100
14/14 [==============================] - 0s 6ms/step - loss: 1.3408 - acc:
0.7700
Epoch 14/100
14/14 [==============================] - 0s 6ms/step - loss: 1.3921 - acc:
0.7793
Epoch 15/100
14/14 [==============================] - 0s 7ms/step - loss: 0.5585 - acc:
0.9131
Epoch 16/100
14/14 [==============================] - 0s 7ms/step - loss: 0.4804 - acc:
0.9202
Epoch 17/100
14/14 [==============================] - 0s 8ms/step - loss: 0.4784 - acc:
0.9061
Epoch 18/100
14/14 [==============================] - 0s 8ms/step - loss: 0.6083 - acc:
0.8826
Epoch 19/100
14/14 [==============================] - 0s 8ms/step - loss: 0.5121 - acc:
```

```
0.9061
Epoch 20/100
14/14 [==============================] - 0s 6ms/step - loss: 0.4183 - acc:
0.9131
Epoch 21/100
14/14 [==============================] - 0s 7ms/step - loss: 0.4754 - acc:
0.8897
Epoch 22/100
14/14 [==============================] - 0s 7ms/step - loss: 0.3698 - acc:
0.9202
Epoch 23/100
14/14 [==============================] - 0s 7ms/step - loss: 0.2882 - acc:
0.9272
Epoch 24/100
14/14 [==============================] - 0s 6ms/step - loss: 0.2430 - acc:
0.9413
Epoch 25/100
14/14 [==============================] - 0s 7ms/step - loss: 0.3207 - acc:
0.9085
Epoch 26/100
14/14 [==============================] - 0s 6ms/step - loss: 0.2057 - acc:
0.9343
Epoch 27/100
14/14 [==============================] - 0s 7ms/step - loss: 0.2372 - acc:
0.9319
Epoch 28/100
14/14 [==============================] - 0s 7ms/step - loss: 0.2152 - acc:
0.9437
Epoch 29/100
14/14 [==============================] - 0s 9ms/step - loss: 0.2320 - acc:
0.9296
Epoch 30/100
14/14 [==============================] - 0s 7ms/step - loss: 0.2602 - acc:
0.9202
Epoch 31/100
14/14 [==============================] - 0s 6ms/step - loss: 0.6061 - acc:
0.8732
Epoch 32/100
14/14 [==============================] - 0s 7ms/step - loss: 0.5485 - acc:
0.9061
Epoch 33/100
14/14 [==============================] - 0s 7ms/step - loss: 0.2998 - acc:
0.9296
Epoch 34/100
14/14 [==============================] - 0s 7ms/step - loss: 0.3065 - acc:
0.9249
Epoch 35/100
14/14 [==============================] - 0s 6ms/step - loss: 0.6412 - acc:
0.9085
Epoch 36/100
14/14 [==============================] - 0s 7ms/step - loss: 0.2854 - acc:
0.9155
Epoch 37/100
14/14 [==============================] - 0s 7ms/step - loss: 0.2839 - acc:
0.9413
Epoch 38/100
```

```
14/14 [==============================] - 0s 7ms/step - loss: 0.2528 - acc:
0.9249
Epoch 39/100
14/14 [==============================] - 0s 7ms/step - loss: 0.2578 - acc:
0.9249
Epoch 40/100
14/14 [==============================] - 0s 7ms/step - loss: 0.2311 - acc:
0.9296
Epoch 41/100
14/14 [==============================] - 0s 7ms/step - loss: 0.4182 - acc:
0.8991
Epoch 42/100
14/14 [==============================] - 0s 7ms/step - loss: 0.2892 - acc:
0.9225
Epoch 43/100
14/14 [==============================] - 0s 7ms/step - loss: 0.5115 - acc:
0.8920
Epoch 44/100
14/14 [==============================] - 0s 6ms/step - loss: 0.5050 - acc:
0.8920
Epoch 45/100
14/14 [==============================] - 0s 7ms/step - loss: 0.4180 - acc:
0.9014
Epoch 46/100
14/14 [==============================] - 0s 7ms/step - loss: 0.2097 - acc:
0.9296
Epoch 47/100
14/14 [==============================] - 0s 8ms/step - loss: 0.5272 - acc:
0.8944
Epoch 48/100
14/14 [==============================] - 0s 6ms/step - loss: 0.3840 - acc:
0.9225
Epoch 49/100
14/14 [==============================] - 0s 7ms/step - loss: 0.5648 - acc:
0.8826
Epoch 50/100
14/14 [==============================] - 0s 7ms/step - loss: 0.3585 - acc:
0.9131
Epoch 51/100
14/14 [==============================] - 0s 7ms/step - loss: 1.1378 - acc:
0.8568
Epoch 52/100
14/14 [==============================] - 0s 6ms/step - loss: 0.5109 - acc:
0.9108
Epoch 53/100
14/14 [==============================] - 0s 7ms/step - loss: 0.3628 - acc:
0.9225
Epoch 54/100
14/14 [==============================] - 0s 5ms/step - loss: 0.3719 - acc:
0.9131
Epoch 55/100
14/14 [==============================] - 0s 4ms/step - loss: 0.3044 - acc:
0.9178
Epoch 56/100
14/14 [==============================] - 0s 5ms/step - loss: 0.3039 - acc:
0.9085
```

```
Epoch 57/100
14/14 [==============================] - 0s 4ms/step - loss: 0.2584 - acc:
0.9202
Epoch 58/100
14/14 [==============================] - 0s 5ms/step - loss: 0.4254 - acc:
0.8920
Epoch 59/100
14/14 [==============================] - 0s 5ms/step - loss: 0.6262 - acc:
0.8826
Epoch 60/100
14/14 [==============================] - 0s 5ms/step - loss: 0.3991 - acc:
0.9366
Epoch 61/100
14/14 [==============================] - 0s 10ms/step - loss: 0.2717 - acc:
0.9366
Epoch 62/100
14/14 [==============================] - 0s 18ms/step - loss: 0.5766 - acc:
0.8732
Epoch 63/100
14/14 [==============================] - 0s 17ms/step - loss: 0.3133 - acc:
0.9249
Epoch 64/100
14/14 [==============================] - 0s 18ms/step - loss: 0.4403 - acc:
0.8920
Epoch 65/100
14/14 [==============================] - 0s 18ms/step - loss: 0.3021 - acc:
0.9249
Epoch 66/100
14/14 [==============================] - 0s 18ms/step - loss: 0.2143 - acc:
0.9343
Epoch 67/100
14/14 [==============================] - 0s 11ms/step - loss: 0.1917 - acc:
0.9413
Epoch 68/100
14/14 [==============================] - 0s 5ms/step - loss: 0.4159 - acc:
0.8873
Epoch 69/100
14/14 [==============================] - 0s 7ms/step - loss: 0.3293 - acc:
0.9272
Epoch 70/100
14/14 [==============================] - 0s 7ms/step - loss: 0.3228 - acc:
0.9131
Epoch 71/100
14/14 [==============================] - 0s 6ms/step - loss: 0.3854 - acc:
0.8991
Epoch 72/100
14/14 [==============================] - 0s 6ms/step - loss: 0.5830 - acc:
0.8944
Epoch 73/100
14/14 [==============================] - 0s 7ms/step - loss: 0.5312 - acc:
0.8897
Epoch 74/100
14/14 [==============================] - 0s 5ms/step - loss: 0.3994 - acc:
0.9178
Epoch 75/100
14/14 [==============================] - 0s 7ms/step - loss: 0.2204 - acc:
```

```
0.9366
Epoch 76/100
14/14 [==============================] - 0s 6ms/step - loss: 0.1928 - acc:
0.9366
Epoch 77/100
14/14 [==============================] - 0s 6ms/step - loss: 0.2992 - acc:
0.9155
Epoch 78/100
14/14 [==============================] - 0s 7ms/step - loss: 0.2991 - acc:
0.9319
Epoch 79/100
14/14 [==============================] - 0s 5ms/step - loss: 0.2057 - acc:
0.9272
Epoch 80/100
14/14 [==============================] - 0s 6ms/step - loss: 0.2408 - acc:
0.9366
Epoch 81/100
14/14 [==============================] - 0s 6ms/step - loss: 0.2039 - acc:
0.9249
Epoch 82/100
14/14 [==============================] - 0s 13ms/step - loss: 0.1978 - acc:
0.9343
Epoch 83/100
14/14 [==============================] - 0s 12ms/step - loss: 0.2641 - acc:
0.9202: 0s - loss: 0.3534 - acc: 0.92
Epoch 84/100
14/14 [==============================] - 0s 12ms/step - loss: 0.1954 - acc:
0.9319
Epoch 85/100
14/14 [==============================] - 0s 13ms/step - loss: 0.1996 - acc:
0.9437
Epoch 86/100
```

```
14/14 [==============================] - 0s 13ms/step - loss: 0.4201 - acc:
0.9038
Epoch 87/100
14/14 [==============================] - 0s 13ms/step - loss: 0.2326 - acc:
0.9319
Epoch 88/100
14/14 [==============================] - 0s 12ms/step - loss: 0.1862 - acc:
0.9319
Epoch 89/100
14/14 [==============================] - 0s 12ms/step - loss: 0.2021 - acc:
0.9413
Epoch 90/100
14/14 [==============================] - 0s 8ms/step - loss: 0.2456 - acc:
0.9225
Epoch 91/100
14/14 [==============================] - 0s 8ms/step - loss: 0.1920 - acc:
0.9437
Epoch 92/100
14/14 [==============================] - 0s 8ms/step - loss: 0.1719 - acc:
0.9272
Epoch 93/100
14/14 [==============================] - 0s 5ms/step - loss: 0.1654 - acc:
0.9390
Epoch 94/100
14/14 [==============================] - 0s 7ms/step - loss: 0.6003 - acc:
0.8873
Epoch 95/100
14/14 [==============================] - 0s 5ms/step - loss: 0.6185 - acc:
0.8803
Epoch 96/100
14/14 [==============================] - 0s 7ms/step - loss: 0.3590 - acc:
0.9202
Epoch 97/100
14/14 [==============================] - 0s 5ms/step - loss: 0.2131 - acc:
0.9319
Epoch 98/100
14/14 [==============================] - 0s 7ms/step - loss: 0.2468 - acc:
0.9272
Epoch 99/100
14/14 [==============================] - 0s 5ms/step - loss: 0.2093 - acc:
0.9249
Epoch 100/100
14/14 [==============================] - 0s 6ms/step - loss: 0.1588 - acc:
0.9484
Model: "sequential_8"
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
dense_18 (Dense)             (None, 66)                2046
_________________________________________________________________
dense_19 (Dense)             (None, 132)               8844
_________________________________________________________________
dense_20 (Dense)             (None, 1)                 133
=================================================================
Total params: 11,023
Trainable params: 11,023
```

```
Non-trainable params: 0
_________________________________________________________________
None
5/5 [==============================] - 0s 4ms/step - loss: 0.2408 - acc: 0.9
441
[0.2408324033021927, 0.9440559148788452]
```

ICP-4 Video URL : https://drive.google.com/file/d/184y5XslFMFO88a2vGCJRHv usp=drive_link

In [ ]: