In [5]:
```
import pandas as pd ## for creating dataframe
import numpy as np  ## array manupulation
```

In [6]:
```
df=pd.read_csv('data_re.csv') ## read  thedata and create a dataframe
```

In [7]:
```
###ok before go into the machine learning algorithm
### clean the data
```

In [8]:
```
df.head()  ## peak of the data from the head side
```

Out[8]:

	Date	Spot	Types of road	Injured	Death	How	Insane	Addicted	Unathorized
0	May 01,2018	Hatirjheel, Dhaka	1	0	2	Motorcycle skidded off the road after hitting ...	1	1	0
1	June 28,2017	Kalapani,Guimara, Khagrachari	2	10	3	After skidded off the road the bus hit the tree.	1	0	0
2	February 23,2018	Mymensingh road	2	25	4	bus felt into Roadside ditch	1	0	0
3	February 7,2018	Sunamganj pagla bazar	2	0	4	bus and private car collision	0	0	1
4	December 18,2018	Gazipur sarak	3	2	1	bus thrush rickshaw	1	0	0

5 rows × 23 columns

```
In [9]: df.tail()  ### data from tail side
```

Out[9]:

	Date	Spot	Types of road	Injured	Death	How	Insane	Addicted	Unathorized	experie
35	December 17,2018	Naval academy road	1	0	0	no	1	1	0	
36	january 14,2018	Dhaka Ctg road	4	0	0	no	1	0	0	
37	january 19 12,2018	Patiya, Chittagong	1	0	0	no	1	1	0	
38	january 27,2018	Chokoria,Coxs Bazar	3	0	0	no	1	0	0	
39	December 15,2018	Agrabad Access road	1	0	0	no	1	0	0	

5 rows × 23 columns

```
In [10]: ## first drop the how column cant deal with it and vehical column
         ## when we drop a column in pandas it will return a new data frame
         df = df.drop('How',1)
         df = df.drop('Date',1)
         df = df.drop('Spot',1)
```

```
In [11]: ## lets see it again
         df.head()
```

Out[11]:

	Types of road	Injured	Death	Insane	Addicted	Unathorized	Less experience	overall	Road bad condition	Unconce
0	1	0	2	1	1	0	0.0	0.50	0	

	Types of road	Injured	Death	Insane	Addicted	Unathorized	Less experience	overall	Road bad condition	Unconce
1	2	10	3	1	0	0	0.0	0.25	0	
2	2	25	4	1	0	0	1.0	0.50	1	
3	2	0	4	0	0	1	0.0	0.25	1	
4	3	2	1	1	0	0	0.0	0.25	1	

In [12]:
```
list(df.columns.values)
```

Out[12]:
```
['Types of road',
 'Injured',
 'Death',
 'Insane',
 'Addicted',
 'Unathorized',
 'Less experience',
 'overall',
 'Road bad condition',
 'Unconcerpedestrian',
 'bad weather',
 'overall.1',
 'Unfitness',
 'no liscence',
 'Aged',
 'overall.2',
 'Unnamed: 19',
 'Average of total fault',
 'Accident',
 'Vehicle']
```

In [13]:
```
### unnamed 14 column has mixed thing removing it
#df=df.drop('Unnamed: 14',1)
```

In [14]:
```
##lets see it now
```

```
df.head()
```

Out[14]:

	Types of road	Injured	Death	Insane	Addicted	Unathorized	Less experience	overall	Road bad condition	Unconce
0	1	0	2	1	1	0	0.0	0.50	0	
1	2	10	3	1	0	0	0.0	0.25	0	
2	2	25	4	1	0	0	1.0	0.50	1	
3	2	0	4	0	0	1	0.0	0.25	1	
4	3	2	1	1	0	0	0.0	0.25	1	

In [15]:

```
## creating a function that can perform relation between the survive an
d dead people with
## other catagory

## create a bar chart
def barchart(feature):
    survived=df[df['Accident']==1][feature].value_counts()
    dead=df[df['Accident']==0][feature].value_counts()
    #survived1=survived[1]
    #dead1=dead[0]
    df1 = pd.DataFrame([survived,dead])
    df1.index=['survived','dead']
    df1.plot(kind='bar',stacked=True,figsize=(10,5))
```

In [16]:

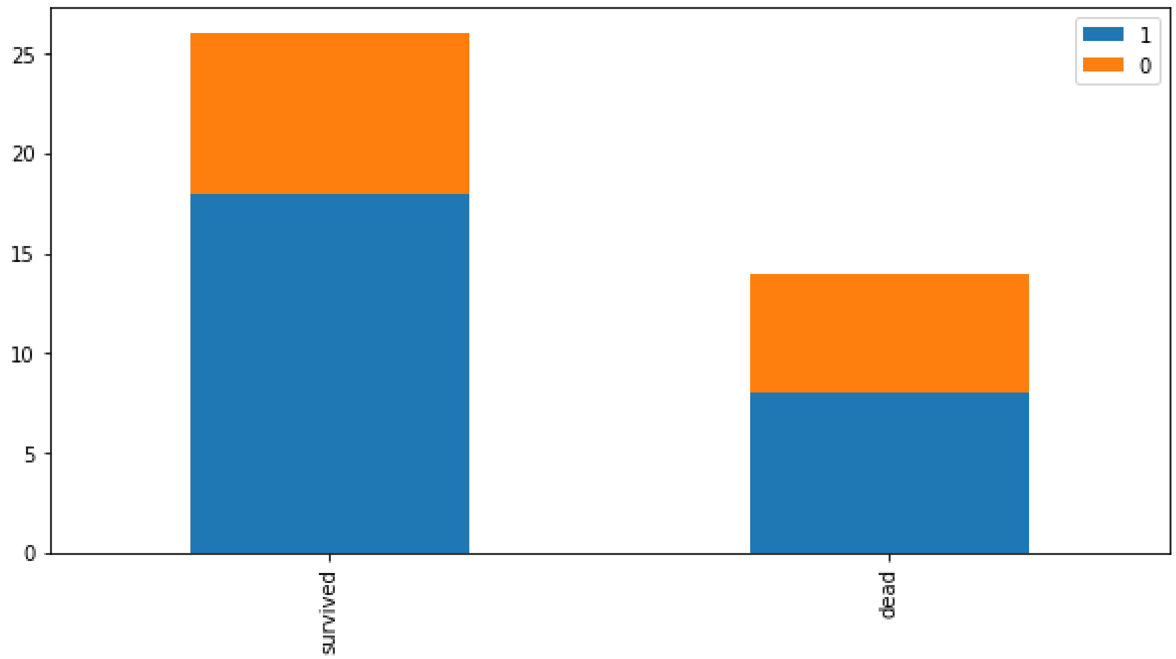
```
## barchart based on the survived based on different parameter
```

In [17]:

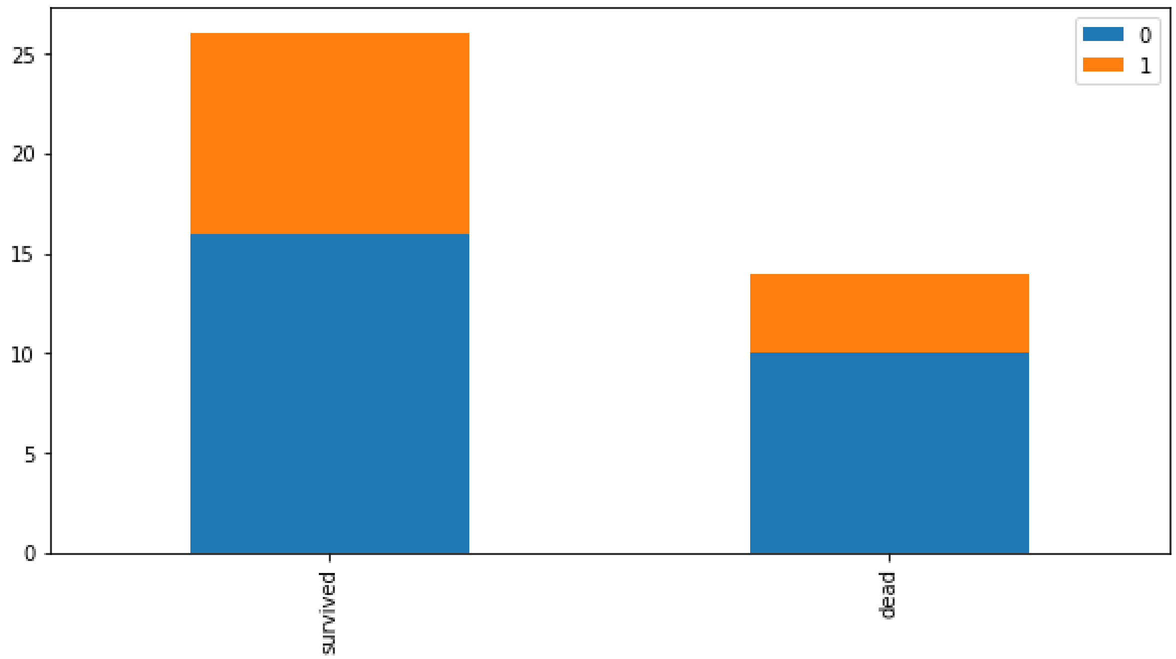
```
barchart('Addicted')   ## how many survived people are addiected and ho
w many dead are addicted
```

In [18]:

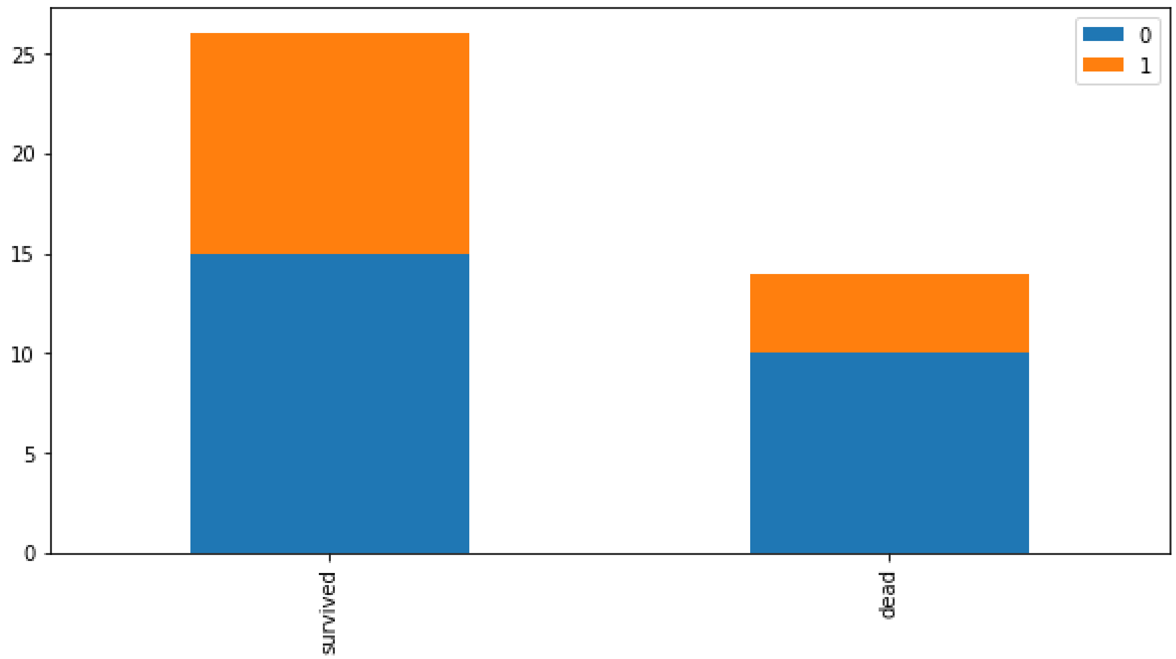
```
barchart('Insane') # same like this
```



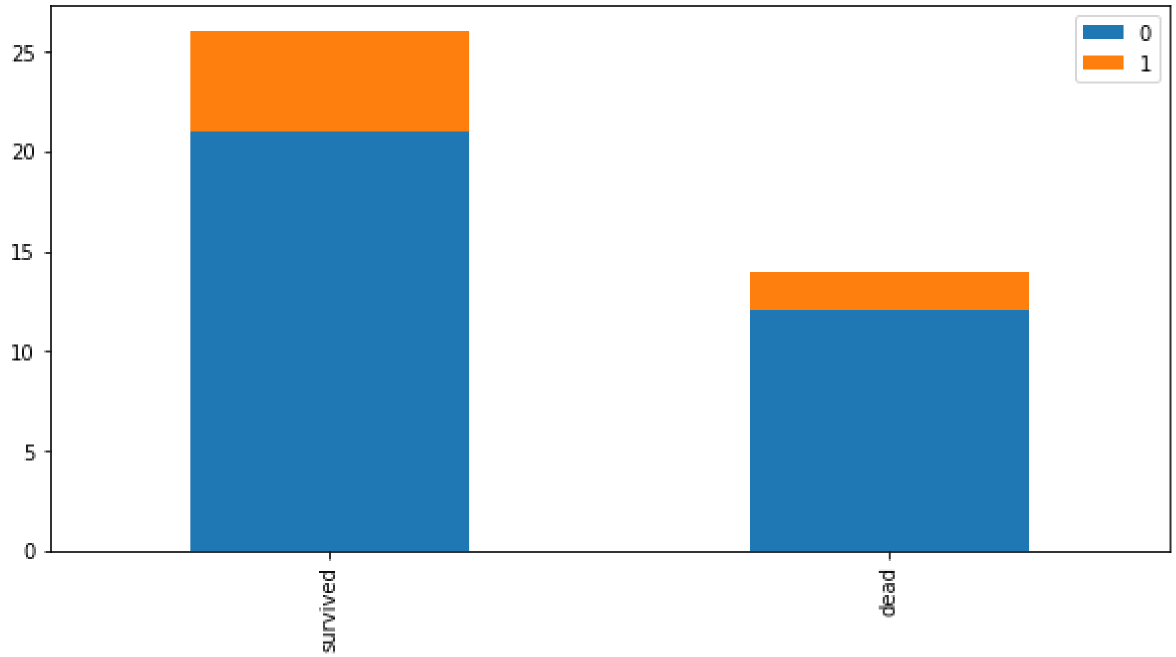
In [19]:
```
barchart('Unathorized')
```



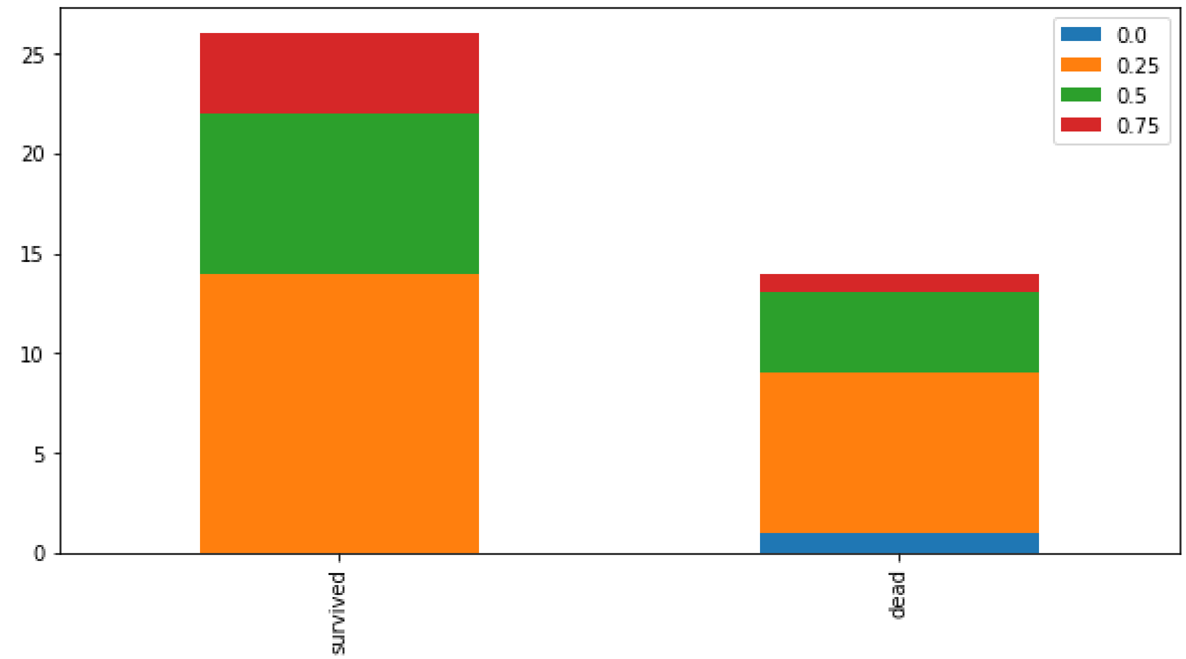

```
In [20]: barchart('Road bad condition')
```




```
In [21]: barchart('no liscence')  ##  survived and dead with lisense and no lise
nse
```



In [22]:
```
barchart('overall')   ## over all column plotting
```



In [24]:
```
df.isnull().sum()   ## no null digit
df=df.fillna(0)
```

In [25]:
```
df.isnull().sum()
```

Out[25]:
```
Types of road          0
Injured                0
Death                  0
Insane                 0
Addicted               0
Unathorized            0
Less experience        0
overall                0
Road bad condition     0
Unconcerpedestrian     0
bad weather            0
overall.1              0
Unfitness              0
```

```
no liscence              0
Aged                     0
overall.2                0
Unnamed: 19              0
Average of total fault   0
Accident                 0
Vehicle                  0
dtype: int64
```

In [26]:

```
from sklearn.tree import DecisionTreeClassifier
from sklearn.neighbors import KNeighborsClassifier
from sklearn.svm import SVC,LinearSVC
from sklearn.ensemble import RandomForestClassifier,GradientBoostingCla
ssifier


## importing all the algorithm
```

In [27]:

```
from sklearn.model_selection import train_test_split
from sklearn.model_selection import cross_val_score
```

In [28]:

```
x=np.array(df.drop('Accident',1))  ## training featurre
```

In [29]:

```
y=np.array(df['Accident'])        ## traget values
```

In [30]:

```
## slipping the training value
X_train,X_test,y_train,y_test = train_test_split(x,y,test_size=0.3)
```

In [31]:

```
MachineLearningAlgo=[]
X=['LinearSVC','DecisionTreeClassifier','KNeighborsClassifier','SVC','G
radientBoostingClassifier','RandomForestClassifier']
Z=[LinearSVC(),DecisionTreeClassifier(),KNeighborsClassifier(),SVC(),Gr
adientBoostingClassifier(),RandomForestClassifier()]
```

In [32]:

```
for model in Z:
    model.fit(X_train,y_train)      ## training the model this could ta
```

```
ke a little time
    accuracy=model.score(X_test,y_test)    ## comparing result with the
 test data set
    MachineLearningAlgo.append(accuracy)   ## saving the accuracy
```

```
/home/vagrant/.local/lib/python3.6/site-packages/sklearn/svm/base.py:19
6: FutureWarning: The default value of gamma will change from 'auto' to
'scale' in version 0.22 to account better for unscaled features. Set ga
mma explicitly to 'auto' or 'scale' to avoid this warning.
  "avoid this warning.", FutureWarning)
/home/vagrant/.local/lib/python3.6/site-packages/sklearn/ensemble/fores
t.py:246: FutureWarning: The default value of n_estimators will change
from 10 in version 0.20 to 100 in 0.22.
  "10 in version 0.20 to 100 in 0.22.", FutureWarning)
```

In [33]:
```
MachineLearningAlgo
```

Out[33]:
```
[0.9166666666666666, 1.0, 0.6666666666666666, 0.75, 1.0, 1.0]
```

In [34]:
```
d={'Accuracy':MachineLearningAlgo,'Algorithm':X}
df1=pd.DataFrame(d)
```

In [35]:
```
df1
```

Out[35]:

	Accuracy	Algorithm
0	0.916667	LinearSVC
1	1.000000	DecisionTreeClassifier
2	0.666667	KNeighborsClassifier
3	0.750000	SVC
4	1.000000	GradientBoostingClassifier
5	1.000000	RandomForestClassifier

this is only happen when we get small data set Linear svc done preety well but we get 100% accuracy its only happen in small data set this is from different classification algorithm not from tensor flow so we can compare the result

using tensorflow and keras for deep nural network

In [36]:
```
import tensorflow as tf
```

In [37]:
```
## using sequential deep  nural network
model = tf.keras.models.Sequential()
```

In [38]:
```
## adding 5 hidden layer

model.add(tf.keras.layers.Flatten()) #first layer have to be flatten
model.add(tf.keras.layers.Dense(128,activation = tf.nn.relu)) ## then w
e added a dense layer
model.add(tf.keras.layers.Dense(128,activation = tf.nn.relu))
model.add(tf.keras.layers.Dense(128,activation = tf.nn.relu))
model.add(tf.keras.layers.Dense(2,activation = tf.nn.softmax))
```

In [39]:
```
model.compile(optimizer='adam',loss='sparse_categorical_crossentropy',m
etrics=['accuracy'])
```

we use 1 flatten layer and 5 dense layer that means 6 hidden layer and we use 300 iteration for training the DNN model in tensorflow

In [40]:
```
model.fit(X_train,y_train,epochs=300)
```

```
Epoch 1/300
28/28 [==============================] - 4s 137ms/step - loss: 0.9286 -
acc: 0.3571
Epoch 2/300
28/28 [==============================] - 0s 534us/step - loss: 0.6626 -
```

```
acc: 0.5714
Epoch 3/300
28/28 [==============================] - 0s 466us/step - loss: 0.5453 -
acc: 0.6786
Epoch 4/300
28/28 [==============================] - 0s 863us/step - loss: 0.4922 -
acc: 0.6429
Epoch 5/300
28/28 [==============================] - 0s 604us/step - loss: 0.4636 -
acc: 0.6429
Epoch 6/300
28/28 [==============================] - 0s 735us/step - loss: 0.4425 -
acc: 0.6429
Epoch 7/300
28/28 [==============================] - 0s 872us/step - loss: 0.4211 -
acc: 0.6429
Epoch 8/300
28/28 [==============================] - 0s 675us/step - loss: 0.3972 -
acc: 0.6429
Epoch 9/300
28/28 [==============================] - 0s 768us/step - loss: 0.3720 -
acc: 0.7143
Epoch 10/300
28/28 [==============================] - 0s 855us/step - loss: 0.3471 -
acc: 0.8571
Epoch 11/300
28/28 [==============================] - 0s 871us/step - loss: 0.3239 -
acc: 0.9643
Epoch 12/300
28/28 [==============================] - 0s 566us/step - loss: 0.3022 -
acc: 1.0000
Epoch 13/300
28/28 [==============================] - 0s 704us/step - loss: 0.2816 -
acc: 1.0000
Epoch 14/300
28/28 [==============================] - 0s 2ms/step - loss: 0.2624 - a
cc: 1.0000
Epoch 15/300
28/28 [==============================] - 0s 710us/step - loss: 0.2435 -
```

```
acc: 1.0000
Epoch 16/300
28/28 [==============================] - 0s 890us/step - loss: 0.2245 -
acc: 1.0000
Epoch 17/300
28/28 [==============================] - 0s 707us/step - loss: 0.2054 -
acc: 1.0000
Epoch 18/300
28/28 [==============================] - 0s 875us/step - loss: 0.1865 -
acc: 1.0000
Epoch 19/300
28/28 [==============================] - 0s 579us/step - loss: 0.1683 -
acc: 1.0000
Epoch 20/300
28/28 [==============================] - 0s 1ms/step - loss: 0.1512 - a
cc: 1.0000
Epoch 21/300
28/28 [==============================] - 0s 650us/step - loss: 0.1357 -
acc: 1.0000
Epoch 22/300
28/28 [==============================] - 0s 1ms/step - loss: 0.1213 - a
cc: 1.0000
Epoch 23/300
28/28 [==============================] - 0s 837us/step - loss: 0.1081 -
acc: 1.0000
Epoch 24/300
28/28 [==============================] - 0s 2ms/step - loss: 0.0956 - a
cc: 1.0000
Epoch 25/300
28/28 [==============================] - 0s 1ms/step - loss: 0.0838 - a
cc: 1.0000
Epoch 26/300
28/28 [==============================] - 0s 1ms/step - loss: 0.0729 - a
cc: 1.0000
Epoch 27/300
28/28 [==============================] - 0s 918us/step - loss: 0.0632 -
acc: 1.0000
Epoch 28/300
28/28 [==============================] - 0s 2ms/step - loss: 0.0547 - a
```

```
cc: 1.0000
Epoch 29/300
28/28 [==============================] - 0s 972us/step - loss: 0.0474 -
acc: 1.0000
Epoch 30/300
28/28 [==============================] - 0s 562us/step - loss: 0.0412 -
acc: 1.0000
Epoch 31/300
28/28 [==============================] - 0s 836us/step - loss: 0.0358 -
acc: 1.0000
Epoch 32/300
28/28 [==============================] - 0s 921us/step - loss: 0.0311 -
acc: 1.0000
Epoch 33/300
28/28 [==============================] - 0s 611us/step - loss: 0.0269 -
acc: 1.0000
Epoch 34/300
28/28 [==============================] - 0s 602us/step - loss: 0.0233 -
acc: 1.0000
Epoch 35/300
28/28 [==============================] - 0s 689us/step - loss: 0.0201 -
acc: 1.0000
Epoch 36/300
28/28 [==============================] - 0s 1ms/step - loss: 0.0175 - a
cc: 1.0000
Epoch 37/300
28/28 [==============================] - 0s 581us/step - loss: 0.0153 -
acc: 1.0000
Epoch 38/300
28/28 [==============================] - 0s 904us/step - loss: 0.0134 -
acc: 1.0000
Epoch 39/300
28/28 [==============================] - 0s 1ms/step - loss: 0.0117 - a
cc: 1.0000
Epoch 40/300
28/28 [==============================] - 0s 710us/step - loss: 0.0103 -
acc: 1.0000
Epoch 41/300
28/28 [==============================] - 0s 894us/step - loss: 0.0090 -
```

```
acc: 1.0000
Epoch 42/300
28/28 [==============================] - 0s 1ms/step - loss: 0.0080 - a
cc: 1.0000
Epoch 43/300
28/28 [==============================] - 0s 856us/step - loss: 0.0071 -
acc: 1.0000
Epoch 44/300
28/28 [==============================] - 0s 1ms/step - loss: 0.0063 - a
cc: 1.0000
Epoch 45/300
28/28 [==============================] - 0s 572us/step - loss: 0.0056 -
acc: 1.0000
Epoch 46/300
28/28 [==============================] - 0s 725us/step - loss: 0.0051 -
acc: 1.0000
Epoch 47/300
28/28 [==============================] - 0s 1ms/step - loss: 0.0046 - a
cc: 1.0000
Epoch 48/300
28/28 [==============================] - 0s 845us/step - loss: 0.0041 -
acc: 1.0000
Epoch 49/300
28/28 [==============================] - 0s 764us/step - loss: 0.0037 -
acc: 1.0000
Epoch 50/300
28/28 [==============================] - 0s 620us/step - loss: 0.0034 -
acc: 1.0000
Epoch 51/300
28/28 [==============================] - 0s 1ms/step - loss: 0.0031 - a
cc: 1.0000
Epoch 52/300
28/28 [==============================] - 0s 891us/step - loss: 0.0028 -
acc: 1.0000
Epoch 53/300
28/28 [==============================] - 0s 679us/step - loss: 0.0026 -
acc: 1.0000
Epoch 54/300
28/28 [==============================] - 0s 888us/step - loss: 0.0024 -
```

```
acc: 1.0000
Epoch 55/300
28/28 [==============================] - 0s 569us/step - loss: 0.0022 -
acc: 1.0000
Epoch 56/300
28/28 [==============================] - 0s 1ms/step - loss: 0.0020 - a
cc: 1.0000
Epoch 57/300
28/28 [==============================] - 0s 1ms/step - loss: 0.0019 - a
cc: 1.0000
Epoch 58/300
28/28 [==============================] - 0s 765us/step - loss: 0.0017 -
acc: 1.0000
Epoch 59/300
28/28 [==============================] - 0s 1ms/step - loss: 0.0016 - a
cc: 1.0000
Epoch 60/300
28/28 [==============================] - 0s 736us/step - loss: 0.0015 -
acc: 1.0000
Epoch 61/300
28/28 [==============================] - 0s 542us/step - loss: 0.0014 -
acc: 1.0000
Epoch 62/300
28/28 [==============================] - 0s 731us/step - loss: 0.0013 -
acc: 1.0000
Epoch 63/300
28/28 [==============================] - 0s 1ms/step - loss: 0.0013 - a
cc: 1.0000
Epoch 64/300
28/28 [==============================] - 0s 1ms/step - loss: 0.0012 - a
cc: 1.0000
Epoch 65/300
28/28 [==============================] - 0s 917us/step - loss: 0.0011 -
acc: 1.0000
Epoch 66/300
28/28 [==============================] - 0s 891us/step - loss: 0.0011 -
acc: 1.0000
Epoch 67/300
28/28 [==============================] - 0s 700us/step - loss: 9.9769e-
```

```
04 - acc: 1.0000
Epoch 68/300
28/28 [==============================] - 0s 541us/step - loss: 9.4618e-
04 - acc: 1.0000
Epoch 69/300
28/28 [==============================] - 0s 1ms/step - loss: 8.9740e-04
- acc: 1.0000
Epoch 70/300
28/28 [==============================] - 0s 1ms/step - loss: 8.5217e-04
- acc: 1.0000
Epoch 71/300
28/28 [==============================] - 0s 671us/step - loss: 8.1033e-
04 - acc: 1.0000
Epoch 72/300
28/28 [==============================] - 0s 814us/step - loss: 7.7024e-
04 - acc: 1.0000
Epoch 73/300
28/28 [==============================] - 0s 847us/step - loss: 7.3051e-
04 - acc: 1.0000
Epoch 74/300
28/28 [==============================] - 0s 1ms/step - loss: 6.9293e-04
- acc: 1.0000
Epoch 75/300
28/28 [==============================] - 0s 503us/step - loss: 6.5682e-
04 - acc: 1.0000
Epoch 76/300
28/28 [==============================] - 0s 1ms/step - loss: 6.2585e-04
- acc: 1.0000
Epoch 77/300
28/28 [==============================] - 0s 538us/step - loss: 5.9762e-
04 - acc: 1.0000
Epoch 78/300
28/28 [==============================] - 0s 500us/step - loss: 5.7027e-
04 - acc: 1.0000
Epoch 79/300
28/28 [==============================] - 0s 1ms/step - loss: 5.4385e-04
- acc: 1.0000
Epoch 80/300
28/28 [==============================] - 0s 705us/step - loss: 5.1848e-
```

```
04 - acc: 1.0000
Epoch 81/300
28/28 [==============================] - 0s 1ms/step - loss: 4.9442e-04
- acc: 1.0000
Epoch 82/300
28/28 [==============================] - 0s 542us/step - loss: 4.7201e-
04 - acc: 1.0000
Epoch 83/300
28/28 [==============================] - 0s 921us/step - loss: 4.5124e-
04 - acc: 1.0000
Epoch 84/300
28/28 [==============================] - 0s 897us/step - loss: 4.3214e-
04 - acc: 1.0000
Epoch 85/300
28/28 [==============================] - 0s 879us/step - loss: 4.1435e-
04 - acc: 1.0000
Epoch 86/300
28/28 [==============================] - 0s 689us/step - loss: 3.9755e-
04 - acc: 1.0000
Epoch 87/300
28/28 [==============================] - 0s 874us/step - loss: 3.8170e-
04 - acc: 1.0000
Epoch 88/300
28/28 [==============================] - 0s 1ms/step - loss: 3.6647e-04
- acc: 1.0000
Epoch 89/300
28/28 [==============================] - 0s 731us/step - loss: 3.5178e-
04 - acc: 1.0000
Epoch 90/300
28/28 [==============================] - 0s 1ms/step - loss: 3.3755e-04
- acc: 1.0000
Epoch 91/300
28/28 [==============================] - 0s 751us/step - loss: 3.2385e-
04 - acc: 1.0000
Epoch 92/300
28/28 [==============================] - 0s 550us/step - loss: 3.1076e-
04 - acc: 1.0000
Epoch 93/300
28/28 [==============================] - 0s 1ms/step - loss: 2.9825e-04
```

```
- acc: 1.0000
Epoch 94/300
28/28 [==============================] - 0s 743us/step - loss: 2.8636e-
04 - acc: 1.0000
Epoch 95/300
28/28 [==============================] - 0s 839us/step - loss: 2.7512e-
04 - acc: 1.0000
Epoch 96/300
28/28 [==============================] - 0s 1ms/step - loss: 2.6443e-04
- acc: 1.0000
Epoch 97/300
28/28 [==============================] - 0s 735us/step - loss: 2.5422e-
04 - acc: 1.0000
Epoch 98/300
28/28 [==============================] - 0s 1ms/step - loss: 2.4428e-04
- acc: 1.0000
Epoch 99/300
28/28 [==============================] - 0s 549us/step - loss: 2.3445e-
04 - acc: 1.0000
Epoch 100/300
28/28 [==============================] - 0s 844us/step - loss: 2.2495e-
04 - acc: 1.0000
Epoch 101/300
28/28 [==============================] - 0s 1ms/step - loss: 2.1573e-04
- acc: 1.0000
Epoch 102/300
28/28 [==============================] - 0s 1ms/step - loss: 2.0745e-04
- acc: 1.0000
Epoch 103/300
28/28 [==============================] - 0s 797us/step - loss: 1.9964e-
04 - acc: 1.0000
Epoch 104/300
28/28 [==============================] - 0s 1ms/step - loss: 1.9203e-04
- acc: 1.0000
Epoch 105/300
28/28 [==============================] - 0s 650us/step - loss: 1.8466e-
04 - acc: 1.0000
Epoch 106/300
28/28 [==============================] - 0s 1ms/step - loss: 1.7753e-04
```

```
- acc: 1.0000
Epoch 107/300
28/28 [==============================] - 0s 674us/step - loss: 1.7059e-
04 - acc: 1.0000
Epoch 108/300
28/28 [==============================] - 0s 633us/step - loss: 1.6395e-
04 - acc: 1.0000
Epoch 109/300
28/28 [==============================] - 0s 774us/step - loss: 1.5762e-
04 - acc: 1.0000
Epoch 110/300
28/28 [==============================] - 0s 628us/step - loss: 1.5156e-
04 - acc: 1.0000
Epoch 111/300
28/28 [==============================] - 0s 1ms/step - loss: 1.4576e-04
- acc: 1.0000
Epoch 112/300
28/28 [==============================] - 0s 564us/step - loss: 1.4020e-
04 - acc: 1.0000
Epoch 113/300
28/28 [==============================] - 0s 703us/step - loss: 1.3484e-
04 - acc: 1.0000
Epoch 114/300
28/28 [==============================] - 0s 865us/step - loss: 1.2965e-
04 - acc: 1.0000
Epoch 115/300
28/28 [==============================] - 0s 569us/step - loss: 1.2464e-
04 - acc: 1.0000
Epoch 116/300
28/28 [==============================] - 0s 581us/step - loss: 1.1981e-
04 - acc: 1.0000
Epoch 117/300
28/28 [==============================] - 0s 921us/step - loss: 1.1525e-
04 - acc: 1.0000
Epoch 118/300
28/28 [==============================] - 0s 601us/step - loss: 1.1086e-
04 - acc: 1.0000
Epoch 119/300
28/28 [==============================] - 0s 1ms/step - loss: 1.0663e-04
```

```
- acc: 1.0000
Epoch 120/300
28/28 [==============================] - 0s 585us/step - loss: 1.0255e-
04 - acc: 1.0000
Epoch 121/300
28/28 [==============================] - 0s 1ms/step - loss: 9.8631e-05
- acc: 1.0000
Epoch 122/300
28/28 [==============================] - 0s 285us/step - loss: 9.4864e-
05 - acc: 1.0000
Epoch 123/300
28/28 [==============================] - 0s 877us/step - loss: 9.1234e-
05 - acc: 1.0000
Epoch 124/300
28/28 [==============================] - 0s 408us/step - loss: 8.7765e-
05 - acc: 1.0000
Epoch 125/300
28/28 [==============================] - 0s 945us/step - loss: 8.4433e-
05 - acc: 1.0000
Epoch 126/300
28/28 [==============================] - 0s 605us/step - loss: 8.1219e-
05 - acc: 1.0000
Epoch 127/300
28/28 [==============================] - 0s 960us/step - loss: 7.8168e-
05 - acc: 1.0000
Epoch 128/300
28/28 [==============================] - 0s 822us/step - loss: 7.5244e-
05 - acc: 1.0000
Epoch 129/300
28/28 [==============================] - 0s 629us/step - loss: 7.2460e-
05 - acc: 1.0000
Epoch 130/300
28/28 [==============================] - 0s 795us/step - loss: 6.9775e-
05 - acc: 1.0000
Epoch 131/300
28/28 [==============================] - 0s 521us/step - loss: 6.7204e-
05 - acc: 1.0000
Epoch 132/300
28/28 [==============================] - 0s 744us/step - loss: 6.4744e-
```

```
05 - acc: 1.0000
Epoch 133/300
28/28 [==============================] - 0s 643us/step - loss: 6.2386e-
05 - acc: 1.0000
Epoch 134/300
28/28 [==============================] - 0s 604us/step - loss: 6.0151e-
05 - acc: 1.0000
Epoch 135/300
28/28 [==============================] - 0s 698us/step - loss: 5.8010e-
05 - acc: 1.0000
Epoch 136/300
28/28 [==============================] - 0s 515us/step - loss: 5.5963e-
05 - acc: 1.0000
Epoch 137/300
28/28 [==============================] - 0s 708us/step - loss: 5.4009e-
05 - acc: 1.0000
Epoch 138/300
28/28 [==============================] - 0s 665us/step - loss: 5.2144e-
05 - acc: 1.0000
Epoch 139/300
28/28 [==============================] - 0s 533us/step - loss: 5.0352e-
05 - acc: 1.0000
Epoch 140/300
28/28 [==============================] - 0s 643us/step - loss: 4.8641e-
05 - acc: 1.0000
Epoch 141/300
28/28 [==============================] - 0s 804us/step - loss: 4.7011e-
05 - acc: 1.0000
Epoch 142/300
28/28 [==============================] - 0s 1ms/step - loss: 4.5449e-05
- acc: 1.0000
Epoch 143/300
28/28 [==============================] - 0s 535us/step - loss: 4.3942e-
05 - acc: 1.0000
Epoch 144/300
28/28 [==============================] - 0s 348us/step - loss: 4.2512e-
05 - acc: 1.0000
Epoch 145/300
28/28 [==============================] - 0s 949us/step - loss: 4.1145e-
```

```
05 - acc: 1.0000
Epoch 146/300
28/28 [==============================] - 0s 691us/step - loss: 3.9821e-
05 - acc: 1.0000
Epoch 147/300
28/28 [==============================] - 0s 721us/step - loss: 3.8561e-
05 - acc: 1.0000
Epoch 148/300
28/28 [==============================] - 0s 337us/step - loss: 3.7361e-
05 - acc: 1.0000
Epoch 149/300
28/28 [==============================] - 0s 1ms/step - loss: 3.6203e-05
- acc: 1.0000
Epoch 150/300
28/28 [==============================] - 0s 566us/step - loss: 3.5092e-
05 - acc: 1.0000
Epoch 151/300
28/28 [==============================] - 0s 828us/step - loss: 3.4036e-
05 - acc: 1.0000
Epoch 152/300
28/28 [==============================] - 0s 614us/step - loss: 3.3019e-
05 - acc: 1.0000
Epoch 153/300
28/28 [==============================] - 0s 802us/step - loss: 3.2044e-
05 - acc: 1.0000
Epoch 154/300
28/28 [==============================] - 0s 571us/step - loss: 3.1116e-
05 - acc: 1.0000
Epoch 155/300
28/28 [==============================] - 0s 520us/step - loss: 3.0218e-
05 - acc: 1.0000
Epoch 156/300
28/28 [==============================] - 0s 1ms/step - loss: 2.9345e-05
- acc: 1.0000
Epoch 157/300
28/28 [==============================] - 0s 588us/step - loss: 2.8519e-
05 - acc: 1.0000
Epoch 158/300
28/28 [==============================] - 0s 1ms/step - loss: 2.7761e-05
```

```
- acc: 1.0000
Epoch 159/300
28/28 [==============================] - 0s 947us/step - loss: 2.7008e-
05 - acc: 1.0000
Epoch 160/300
28/28 [==============================] - 0s 862us/step - loss: 2.6301e-
05 - acc: 1.0000
Epoch 161/300
28/28 [==============================] - 0s 679us/step - loss: 2.5603e-
05 - acc: 1.0000
Epoch 162/300
28/28 [==============================] - 0s 532us/step - loss: 2.4931e-
05 - acc: 1.0000
Epoch 163/300
28/28 [==============================] - 0s 757us/step - loss: 2.4275e-
05 - acc: 1.0000
Epoch 164/300
28/28 [==============================] - 0s 672us/step - loss: 2.3666e-
05 - acc: 1.0000
Epoch 165/300
28/28 [==============================] - 0s 994us/step - loss: 2.3083e-
05 - acc: 1.0000
Epoch 166/300
28/28 [==============================] - 0s 647us/step - loss: 2.2521e-
05 - acc: 1.0000
Epoch 167/300
28/28 [==============================] - 0s 944us/step - loss: 2.1976e-
05 - acc: 1.0000
Epoch 168/300
28/28 [==============================] - 0s 741us/step - loss: 2.1440e-
05 - acc: 1.0000
Epoch 169/300
28/28 [==============================] - 0s 929us/step - loss: 2.0920e-
05 - acc: 1.0000
Epoch 170/300
28/28 [==============================] - 0s 495us/step - loss: 2.0427e-
05 - acc: 1.0000
Epoch 171/300
28/28 [==============================] - 0s 666us/step - loss: 1.9980e-
```

```
05 - acc: 1.0000
Epoch 172/300
28/28 [==============================] - 0s 780us/step - loss: 1.9516e-
05 - acc: 1.0000
Epoch 173/300
28/28 [==============================] - 0s 563us/step - loss: 1.9090e-
05 - acc: 1.0000
Epoch 174/300
28/28 [==============================] - 0s 780us/step - loss: 1.8660e-
05 - acc: 1.0000
Epoch 175/300
28/28 [==============================] - 0s 913us/step - loss: 1.8247e-
05 - acc: 1.0000
Epoch 176/300
28/28 [==============================] - 0s 626us/step - loss: 1.7864e-
05 - acc: 1.0000
Epoch 177/300
28/28 [==============================] - 0s 816us/step - loss: 1.7506e-
05 - acc: 1.0000
Epoch 178/300
28/28 [==============================] - 0s 690us/step - loss: 1.7149e-
05 - acc: 1.0000
Epoch 179/300
28/28 [==============================] - 0s 628us/step - loss: 1.6791e-
05 - acc: 1.0000
Epoch 180/300
28/28 [==============================] - 0s 1ms/step - loss: 1.6442e-05
- acc: 1.0000
Epoch 181/300
28/28 [==============================] - 0s 730us/step - loss: 1.6123e-
05 - acc: 1.0000
Epoch 182/300
28/28 [==============================] - 0s 486us/step - loss: 1.5795e-
05 - acc: 1.0000
Epoch 183/300
28/28 [==============================] - 0s 723us/step - loss: 1.5488e-
05 - acc: 1.0000
Epoch 184/300
28/28 [==============================] - 0s 707us/step - loss: 1.5212e-
```

```
05 - acc: 1.0000
Epoch 185/300
28/28 [==============================] - 0s 661us/step - loss: 1.4922e-
05 - acc: 1.0000
Epoch 186/300
28/28 [==============================] - 0s 672us/step - loss: 1.4641e-
05 - acc: 1.0000
Epoch 187/300
28/28 [==============================] - 0s 742us/step - loss: 1.4369e-
05 - acc: 1.0000
Epoch 188/300
28/28 [==============================] - 0s 843us/step - loss: 1.4105e-
05 - acc: 1.0000
Epoch 189/300
28/28 [==============================] - 0s 1ms/step - loss: 1.3853e-05
- acc: 1.0000
Epoch 190/300
28/28 [==============================] - 0s 593us/step - loss: 1.3598e-
05 - acc: 1.0000
Epoch 191/300
28/28 [==============================] - 0s 1ms/step - loss: 1.3372e-05
- acc: 1.0000
Epoch 192/300
28/28 [==============================] - 0s 1ms/step - loss: 1.3151e-05
- acc: 1.0000
Epoch 193/300
28/28 [==============================] - 0s 907us/step - loss: 1.2913e-
05 - acc: 1.0000
Epoch 194/300
28/28 [==============================] - 0s 757us/step - loss: 1.2700e-
05 - acc: 1.0000
Epoch 195/300
28/28 [==============================] - 0s 721us/step - loss: 1.2495e-
05 - acc: 1.0000
Epoch 196/300
28/28 [==============================] - 0s 1ms/step - loss: 1.2287e-05
- acc: 1.0000
Epoch 197/300
28/28 [==============================] - 0s 489us/step - loss: 1.2078e-
```

```
05 - acc: 1.0000
Epoch 198/300
28/28 [==============================] - 0s 424us/step - loss: 1.1899e-
05 - acc: 1.0000
Epoch 199/300
28/28 [==============================] - 0s 858us/step - loss: 1.1708e-
05 - acc: 1.0000
Epoch 200/300
28/28 [==============================] - 0s 654us/step - loss: 1.1516e-
05 - acc: 1.0000
Epoch 201/300
28/28 [==============================] - 0s 971us/step - loss: 1.1337e-
05 - acc: 1.0000
Epoch 202/300
28/28 [==============================] - 0s 532us/step - loss: 1.1163e-
05 - acc: 1.0000
Epoch 203/300
28/28 [==============================] - 0s 1ms/step - loss: 1.0993e-05
- acc: 1.0000
Epoch 204/300
28/28 [==============================] - 0s 540us/step - loss: 1.0831e-
05 - acc: 1.0000
Epoch 205/300
28/28 [==============================] - 0s 695us/step - loss: 1.0660e-
05 - acc: 1.0000
Epoch 206/300
28/28 [==============================] - 0s 878us/step - loss: 1.0511e-
05 - acc: 1.0000
Epoch 207/300
28/28 [==============================] - 0s 541us/step - loss: 1.0350e-
05 - acc: 1.0000
Epoch 208/300
28/28 [==============================] - 0s 705us/step - loss: 1.0196e-
05 - acc: 1.0000
Epoch 209/300
28/28 [==============================] - 0s 1ms/step - loss: 1.0056e-05
- acc: 1.0000
Epoch 210/300
28/28 [==============================] - 0s 1ms/step - loss: 9.9112e-06
```

```
- acc: 1.0000
Epoch 211/300
28/28 [==============================] - 0s 647us/step - loss: 9.7792e-
06 - acc: 1.0000
Epoch 212/300
28/28 [==============================] - 0s 871us/step - loss: 9.6387e-
06 - acc: 1.0000
Epoch 213/300
28/28 [==============================] - 0s 693us/step - loss: 9.5068e-
06 - acc: 1.0000
Epoch 214/300
28/28 [==============================] - 0s 988us/step - loss: 9.3748e-
06 - acc: 1.0000
Epoch 215/300
28/28 [==============================] - 0s 517us/step - loss: 9.2556e-
06 - acc: 1.0000
Epoch 216/300
28/28 [==============================] - 0s 816us/step - loss: 9.1193e-
06 - acc: 1.0000
Epoch 217/300
28/28 [==============================] - 0s 1ms/step - loss: 9.0001e-06
- acc: 1.0000
Epoch 218/300
28/28 [==============================] - 0s 557us/step - loss: 8.8852e-
06 - acc: 1.0000
Epoch 219/300
28/28 [==============================] - 0s 959us/step - loss: 8.7532e-
06 - acc: 1.0000
Epoch 220/300
28/28 [==============================] - 0s 872us/step - loss: 8.6425e-
06 - acc: 1.0000
Epoch 221/300
28/28 [==============================] - 0s 703us/step - loss: 8.5233e-
06 - acc: 1.0000
Epoch 222/300
28/28 [==============================] - 0s 1ms/step - loss: 8.4169e-06
- acc: 1.0000
Epoch 223/300
28/28 [==============================] - 0s 535us/step - loss: 8.3105e-
```

```
06 - acc: 1.0000
Epoch 224/300
28/28 [==============================] - 0s 897us/step - loss: 8.2083e-
06 - acc: 1.0000
Epoch 225/300
28/28 [==============================] - 0s 646us/step - loss: 8.1018e-
06 - acc: 1.0000
Epoch 226/300
28/28 [==============================] - 0s 843us/step - loss: 7.9997e-
06 - acc: 1.0000
Epoch 227/300
28/28 [==============================] - 0s 579us/step - loss: 7.8932e-
06 - acc: 1.0000
Epoch 228/300
28/28 [==============================] - 0s 580us/step - loss: 7.8038e-
06 - acc: 1.0000
Epoch 229/300
28/28 [==============================] - 0s 1ms/step - loss: 7.7017e-06
- acc: 1.0000
Epoch 230/300
28/28 [==============================] - 0s 859us/step - loss: 7.6080e-
06 - acc: 1.0000
Epoch 231/300
28/28 [==============================] - 0s 731us/step - loss: 7.5228e-
06 - acc: 1.0000
Epoch 232/300
28/28 [==============================] - 0s 985us/step - loss: 7.4334e-
06 - acc: 1.0000
Epoch 233/300
28/28 [==============================] - 0s 468us/step - loss: 7.3440e-
06 - acc: 1.0000
Epoch 234/300
28/28 [==============================] - 0s 1ms/step - loss: 7.2631e-06
- acc: 1.0000
Epoch 235/300
28/28 [==============================] - 0s 694us/step - loss: 7.1652e-
06 - acc: 1.0000
Epoch 236/300
28/28 [==============================] - 0s 1ms/step - loss: 7.0929e-06
```

```
- acc: 1.0000
Epoch 237/300
28/28 [==============================] - 0s 674us/step - loss: 7.0077e-
06 - acc: 1.0000
Epoch 238/300
28/28 [==============================] - 0s 719us/step - loss: 6.9353e-
06 - acc: 1.0000
Epoch 239/300
28/28 [==============================] - 0s 887us/step - loss: 6.8459e-
06 - acc: 1.0000
Epoch 240/300
28/28 [==============================] - 0s 679us/step - loss: 6.7693e-
06 - acc: 1.0000
Epoch 241/300
28/28 [==============================] - 0s 987us/step - loss: 6.7012e-
06 - acc: 1.0000
Epoch 242/300
28/28 [==============================] - 0s 617us/step - loss: 6.6245e-
06 - acc: 1.0000
Epoch 243/300
28/28 [==============================] - 0s 781us/step - loss: 6.5479e-
06 - acc: 1.0000
Epoch 244/300
28/28 [==============================] - 0s 334us/step - loss: 6.4670e-
06 - acc: 1.0000
Epoch 245/300
28/28 [==============================] - 0s 746us/step - loss: 6.3989e-
06 - acc: 1.0000
Epoch 246/300
28/28 [==============================] - 0s 949us/step - loss: 6.3308e-
06 - acc: 1.0000
Epoch 247/300
28/28 [==============================] - 0s 798us/step - loss: 6.2584e-
06 - acc: 1.0000
Epoch 248/300
28/28 [==============================] - 0s 877us/step - loss: 6.1860e-
06 - acc: 1.0000
Epoch 249/300
28/28 [==============================] - 0s 1ms/step - loss: 6.1264e-06
```

```
- acc: 1.0000
Epoch 250/300
28/28 [==============================] - 0s 680us/step - loss: 6.0668e-
06 - acc: 1.0000
Epoch 251/300
28/28 [==============================] - 0s 729us/step - loss: 5.9945e-
06 - acc: 1.0000
Epoch 252/300
28/28 [==============================] - 0s 494us/step - loss: 5.9434e-
06 - acc: 1.0000
Epoch 253/300
28/28 [==============================] - 0s 876us/step - loss: 5.8752e-
06 - acc: 1.0000
Epoch 254/300
28/28 [==============================] - 0s 960us/step - loss: 5.8156e-
06 - acc: 1.0000
Epoch 255/300
28/28 [==============================] - 0s 736us/step - loss: 5.7603e-
06 - acc: 1.0000
Epoch 256/300
28/28 [==============================] - 0s 1ms/step - loss: 5.7007e-06
- acc: 1.0000
Epoch 257/300
28/28 [==============================] - 0s 593us/step - loss: 5.6496e-
06 - acc: 1.0000
Epoch 258/300
28/28 [==============================] - 0s 1ms/step - loss: 5.5943e-06
- acc: 1.0000
Epoch 259/300
28/28 [==============================] - 0s 887us/step - loss: 5.5347e-
06 - acc: 1.0000
Epoch 260/300
28/28 [==============================] - 0s 1ms/step - loss: 5.4708e-06
- acc: 1.0000
Epoch 261/300
28/28 [==============================] - 0s 516us/step - loss: 5.4240e-
06 - acc: 1.0000
Epoch 262/300
28/28 [==============================] - 0s 795us/step - loss: 5.3771e-
```

```
06 - acc: 1.0000
Epoch 263/300
28/28 [==============================] - 0s 671us/step - loss: 5.3175e-
06 - acc: 1.0000
Epoch 264/300
28/28 [==============================] - 0s 694us/step - loss: 5.2579e-
06 - acc: 1.0000
Epoch 265/300
28/28 [==============================] - 0s 1ms/step - loss: 5.2196e-06
- acc: 1.0000
Epoch 266/300
28/28 [==============================] - 0s 676us/step - loss: 5.1600e-
06 - acc: 1.0000
Epoch 267/300
28/28 [==============================] - 0s 874us/step - loss: 5.1174e-
06 - acc: 1.0000
Epoch 268/300
28/28 [==============================] - 0s 551us/step - loss: 5.0706e-
06 - acc: 1.0000
Epoch 269/300
28/28 [==============================] - 0s 837us/step - loss: 5.0195e-
06 - acc: 1.0000
Epoch 270/300
28/28 [==============================] - 0s 512us/step - loss: 4.9769e-
06 - acc: 1.0000
Epoch 271/300
28/28 [==============================] - 0s 797us/step - loss: 4.9344e-
06 - acc: 1.0000
Epoch 272/300
28/28 [==============================] - 0s 525us/step - loss: 4.8833e-
06 - acc: 1.0000
Epoch 273/300
28/28 [==============================] - 0s 564us/step - loss: 4.8407e-
06 - acc: 1.0000
Epoch 274/300
28/28 [==============================] - 0s 792us/step - loss: 4.8024e-
06 - acc: 1.0000
Epoch 275/300
28/28 [==============================] - 0s 690us/step - loss: 4.7598e-
```

```
06 - acc: 1.0000
Epoch 276/300
28/28 [==============================] - 0s 847us/step - loss: 4.7130e-
06 - acc: 1.0000
Epoch 277/300
28/28 [==============================] - 0s 308us/step - loss: 4.6661e-
06 - acc: 1.0000
Epoch 278/300
28/28 [==============================] - 0s 798us/step - loss: 4.6193e-
06 - acc: 1.0000
Epoch 279/300
28/28 [==============================] - 0s 640us/step - loss: 4.5767e-
06 - acc: 1.0000
Epoch 280/300
28/28 [==============================] - 0s 855us/step - loss: 4.5427e-
06 - acc: 1.0000
Epoch 281/300
28/28 [==============================] - 0s 1ms/step - loss: 4.4916e-06
- acc: 1.0000
Epoch 282/300
28/28 [==============================] - 0s 360us/step - loss: 4.4575e-
06 - acc: 1.0000
Epoch 283/300
28/28 [==============================] - 0s 946us/step - loss: 4.4235e-
06 - acc: 1.0000
Epoch 284/300
28/28 [==============================] - 0s 567us/step - loss: 4.3894e-
06 - acc: 1.0000
Epoch 285/300
28/28 [==============================] - 0s 819us/step - loss: 4.3426e-
06 - acc: 1.0000
Epoch 286/300
28/28 [==============================] - 0s 810us/step - loss: 4.3043e-
06 - acc: 1.0000
Epoch 287/300
28/28 [==============================] - 0s 666us/step - loss: 4.2702e-
06 - acc: 1.0000
Epoch 288/300
28/28 [==============================] - 0s 567us/step - loss: 4.2404e-
```

```
06 - acc: 1.0000
Epoch 289/300
28/28 [==============================] - 0s 931us/step - loss: 4.2021e-
06 - acc: 1.0000
Epoch 290/300
28/28 [==============================] - 0s 756us/step - loss: 4.1638e-
06 - acc: 1.0000
Epoch 291/300
28/28 [==============================] - 0s 741us/step - loss: 4.1425e-
06 - acc: 1.0000
Epoch 292/300
28/28 [==============================] - 0s 1ms/step - loss: 4.0999e-06
- acc: 1.0000
Epoch 293/300
28/28 [==============================] - 0s 310us/step - loss: 4.0701e-
06 - acc: 1.0000
Epoch 294/300
28/28 [==============================] - 0s 1ms/step - loss: 4.0275e-06
- acc: 1.0000
Epoch 295/300
28/28 [==============================] - 0s 743us/step - loss: 4.0020e-
06 - acc: 1.0000
Epoch 296/300
28/28 [==============================] - 0s 478us/step - loss: 3.9722e-
06 - acc: 1.0000
Epoch 297/300
28/28 [==============================] - 0s 885us/step - loss: 3.9424e-
06 - acc: 1.0000
Epoch 298/300
28/28 [==============================] - 0s 284us/step - loss: 3.9083e-
06 - acc: 1.0000
Epoch 299/300
28/28 [==============================] - 0s 995us/step - loss: 3.8785e-
06 - acc: 1.0000
Epoch 300/300
28/28 [==============================] - 0s 669us/step - loss: 3.8445e-
06 - acc: 1.0000
```

Out[40]:

```
<tensorflow.python.keras.callbacks.History at 0x7fa285ce8518>
```

In [41]:
```
val_loss,val_accuracy = model.evaluate(X_test,y_test)
```

```
12/12 [==============================] - 0s 22ms/step
```

In [42]:
```
print (val_accuracy)  ## this accuracy is the total avg accuracy by the
 time we iterate the 300 time we can
                        ## get 1
```

```
0.75
```

Accoring to the tensorflow deep nural network work well if there is a huge ammount of data so this accuracy with a very smaller dataset is preety good

In [43]:
```
# Pass the row elements as key value pairs to append() function
df2 = df1.append({'Accuracy' : val_accuracy , 'Algorithm' : 'Deep nural
 network'} , ignore_index=True)
```

Final result comparison

In [44]:
```
df2
```

Out[44]:

	Accuracy	Algorithm
0	0.916667	LinearSVC
1	1.000000	DecisionTreeClassifier
2	0.666667	KNeighborsClassifier
3	0.750000	SVC
4	1.000000	GradientBoostingClassifier
5	1.000000	RandomForestClassifier
6	0.750000	Deep nural network

In [ ]: